

Faculty of Engineering & Technology

P.K. University

Shivpuri (MP)



**Evaluation Scheme & Syllabus for
Department of Textile Technology**

**Diploma - (Textile Technology)
(I to VI Semester)**

(Effective from session 2019-20)

EVALUATION SCHEME

Diploma - Textile Technology

Semester -I

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
DTT-101	Foundation Communication	30	70	25	25	150
DTT -102	Applied Mathematics-I(A)	30	70	NA	NA	100
DTT -103	Applied Physics-I	30	70	NA	NA	100
DTT -104	Applied Chemistry	30	70	25	25	150
DTT -105	Engineering Drawing	30	70	NA	NA	100

Semester -II

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
DTT -201	Applied Mathematics-I(B)	30	70	NA	NA	100
DTT -202	Applied Physics-II	30	70	25	25	150
DTT -203	General Mechanical Engg.	30	70	25	25	150
DTT -204	Textile Fibers	30	70	25	25	150
DTT-205	Textile Chemical Processing	30	70	NA	NA	100
DTT-206	Workshop practice	NA	NA	25	25	50

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I Year I Semester

DTT-101: FOUNDATION COMMUNICATION

SECTION "A" (ENGLISH)

1. PARTS OF SPEECH :

- a. Noun
- b. The pronoun: Kinds and Usage
- c. The adjective: Kinds and Degree
- d. Determiner: Articles
- e. The verb: Kinds
- f. The Adverb: Kinds, Degree and Usage
- g. Prepositions
- h. Conjunctions
- i. The Interjections
- j. Subject: Verb Agreement (Concord)

2. VOCABULARY BUILDING :

- a. Antonyms and Synonyms
- b. Homophones
- c. One word substitutions
- d. Idioms and Phrases
- e. Abbreviations

3. Grammar

- a. Sentence & its types
- a. Tenses
- b. Punctuations
- c. Active and Passive voice
- d. Transformation of Sentences
- e. Synthesis of Sentences
- f. Direct and Indirect Narrations

4. DEVELOPMENT OF EXPRESSION (Composition) :

- a. Paragraph Writing
- b. Essay Writing
- c. Proposal Writing
- d. Letter Writing (Formal, Informal, Business, official etc.)
- f. Report Writing
- g. Note Making
- h. News Making
- i. Application Writing
- j. Minute Writing
- k. Invitation Letter Writing

SECTION "B" (Hindi)

- 5- संज्ञा, सर्वनाम, विशेषण, क्रियाविषोण, वर्णसमास, संधि, अलंकार, रस, उपसर्गप्रत्यय ।
- 6- पत्र लेखन, निविदासंविदा, दरआमंत्रण (कोटेशन)अपील, स्वतन्त्र अभिव्यक्ति, प्रतिवेदनलेखन, प्रेस विज्ञप्ति ।
- 7- वाक्य/वाक्यांश के लिए शब्द, पर्यायवाची या समानार्थी शब्द, विलोम शब्द, अनेकार्थी शब्द, शब्दयुग्म या समुच्चारित शब्दसमूह, वाक्य शुद्धि (शुद्ध अशुद्ध वाक्य), मुहावरे एवं लोकोक्तियाँ ।

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DTT-102: APPLIED MATHEMATICS-I (A)

1. ALGEBRA-I:

1.1 Series : AP and GP; Sum, nth term, Mean

1.2 Binomial theorem for positive, negative and fractional index (without proof). Application of Binomial theorem.

1.3 Determinants : Elementary properties of determinant of order 2 and 3, Multiplication system of algebraic equation, Consistency of equation, Cramer's rule

2. ALGEBRA-II:

2.1 Vector algebra : Dot and Cross product, Scaler and vector triple product.

2.2 Complex number : Complex numbers, Representation, Modulus and amplitude Demoivre theorem, its application in solving algebraic equations, Mod. function and its properties..

3. TRIGONOMETRY :

3.1 Relation between sides and angles of a triangle : Statement of various formulae showing relationship between sides and angle of a triangle.

3.2 Inverse circular functions : Simple case only

4. DIFFERENTIAL CALCULUS - I :

4.1 Functions, limits, continuity, - functions and their graphs, range and domain, elementary methods of finding limits (right and left), elementary test for continuity and differentiability.

4.2 Methods of finding derivative, - Function of a function, Logarithmic differentiation, Differentiation of implicit functions.

5. DIFFERENTIAL CALCULUS -II :

5.1 Higher order derivatives, Leibnitz theorem.

5.2 Special functions (Exponential, Logarithmic, Inverse circular and function), Definition, Graphs, range and Domain and Derivations of each of these functions.

5.3 Application - Finding Tangents, Normal, Points of Maxima/Minima, Increasing/Decreasing functions, Rate, Measure, velocity, Acceleration, Errors and approximation.

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DTT-103: APPLIED PHYSICS-I

1. UNITS AND DIMENSIONS (4 MARKS)

S.I. Units & Dimensions of physical quantities, Dimensional formula and dimensional equation. Principle of homogeneity of dimensions and applications of homogeneity principle to: (i) Checking the correctness of physical equations, (ii) Deriving relations among various physical quantities, (iii) Conversion of numerical values of physical quantities From one system of units into another. Limitations of dimensional analysis.

2. ERRORS AND MEASUREMENT (4 Marks)

Errors in measurements, accuracy and precision, random and systematic errors, estimation of probable errors in the results of measurement (Combination of errors in addition, subtraction, multiplication and powers). Significant figures, and order of accuracy in respect to instruments,

3. CIRCULAR MOTION (5 MARKS)

Central forces. Uniform Circular motion (Horizontal and Vertical cases), angular velocity, angular acceleration and centripetal acceleration. Relationship between linear and angular velocity and acceleration. Centripetal and centrifugal forces. Practical applications of centripetal forces. Principle of centrifuge.

4. MOTION OF PLANETS AND SATELLITES :(5 Marks)

Gravitational force, Acceleration due to gravity and its variation w.r. to height and depth from earth, Kepler's Law, Escape and orbital velocity, Time period of satellite, Geo- stationary, Polar satellites.

5. DYNAMICS OF RIGID BODY (ROTATIONAL MOTION) (6 MARKS)

Rigid body, Rotational motion, Moment of inertia, Theorems (Perpendicular and Parallel axis) of moment of inertia (Statement). Expression of M.I. of regular bodies (Lamina, Sphere, Disc, Cylindrical), Concept of Radius of gyration, angular momentum, Conservation of angular momentum, Torque, Rotational kinetic energy. Rolling of sphere on the slant plane. Concept of Fly wheel.

6. FLUID MECHANICS :(5 MARKS)

Surface tension, Capillary action and determination of surface tension from capillary rise method, Equation of continuity ($A_1V_1=A_2V_2$), Bernoulli's theorem, and its application stream line and Turbulent flow, Reynold's number.

7. FRICTION :(4 MARKS)

Introduction, Physical significance of friction, Advantage and disadvantage of friction and its role in every day life. Coefficients of static and dynamic friction and their measurements. viscosity, coeff. of viscosity, & its determination by Stoke's method.

8. HARMONIC MOTION (6 MARKS)

Periodic Motion ,characteristics of simple harmonic motion; equation of S.H.M. and determination of velocity and acceleration. Graphical representation. Spring-mass system. Simple pendulum. Derivation of its periodic time. Energy conservation in S.H.M.. Concept of phase, phase difference, Definition of free, forced, undamped and damped vibrations, Resonance and its sharpness, Q-factor.

9. HEAT & THERMODYNAMICS: (6 MARKS)

Modes of heat transfer (Conduction, Convection and Radiation), coefficient of thermal conductivity Isothermal and adiabatic process. Zeroth First, Second Law of Thermodynamics and Carnot cycle, Heat Engine (Concept Only).

10. ACOUSTICS (5 MARKS)

Definition of pitch, loudness, quality and intensity of sound waves. Echo, reverberation and reverberation time. Sabine's formula without Derivation. Control of reverberation time (problems on reverberation time). Acoustics of building defects and remedy.

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I Year I Semester
DTT-104: APPLIED CHEMISTRY

- 1. ATOMIC STRUCTURE :(3 MARKS)** Basic concept of atomic structure, Matter wave concept, Quantum number, Haiseinberg's Uncertainty Principle, Shapes of orbitals.
- 2. CHEMICAL BONDING :(4 MARKS)** Covalent bond, Ionic & Co-ordinate, Hydrogen bonding, Valence bond theory, Hybridisation, VSEPR theory, Molecular orbital theory.
- 3. CLASSIFICATION OF ELEMENTS :(3 MARKS)** Modern classification of elements (s,p,d and f block elements), Periodic properties : Ionisation potential electro negativity, Electron affinity.
- 4. ELECTRO CHEMISTRY-I:(3 MARKS)** Arrhenius Theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of Acid and bases : Bronsted, Arrhenius and Lewis theory. Concept of pH and numericals. Buffer solutions, Indicators, Solubility product, Common ion effect with their application,
- 5. ELECTRO CHEMISTRY-II:(3 MARKS)** Redox reactions, Electrode potential(Nernst Equation), Electro-chemical cell (Galvanic and Electrolytic). EMF of a cell and free energy change. Standard electrode potential, Electro chemical series and its application. Chemical and Electrochemical theory of corrosion, Galvenic Series. Prevention of corrosion by various method.
- 6. CHEMICAL KINETICS :(3 MARKS)** Law of mass action, order and molecularity of rection. Activation energy, rate constants, Ist order reactions and 2nd order reactions.
- 7. CATALYSIS :(2 MARKS)** Definition Characteristics of catalytic reactions, Catalytic promotors and poison , Autocatalysis and Negative catalysis, Theory of catalysis, Application.
- 8. SOLID STATE :(2 MARKS)** Types of solids (Amorphous and Crystalline), Classification (Molecular, Ionic, Covalent, Metallic), Band theory of solids (Conductors, Semiconductors and Insulators), types of Crystals, FCC, BCC, Crystal imperfection.
- 9. FUELS :(3 MARKS)** Definition, its classification, high & low Calorific value.Determination of calorific value of solid and liquid fuels by Bomb calorimeter. Liquid fuel - Petroleum and its refining, distillate of petroleum (Kerosene oil, Disel and Petrol), Benzol and Power alcohol. Knocking, Anti-knocking agents, Octane number and Cetane number. Cracking and its type, Gasoling from hydrogenation of coal (Bergius process and Fischer tropsch's process) Gaseous Fuel - Coal gas, Oil gas, Water gas, Producer gas, Bio gas, LPG and CNG. Numerical Problems based on topics
- 10. WATER TREATMENT:(3 MARKS)** Hardness of water, Its limits and determination of hardness of water by EDTA method. Softening methods (Only Sods lime, Zeolote and Ion exchange resin process). Disadvantage of hard water in different industries, scale and sludge formation, Corrosion, Caustic embrittlement, primming andfoarming in biolers. Disinfecting of Water By Chloramine-T, Ozone and Chlorine. Advantage and disadvantage of chlorinational, Industrial waste and sewage, Municipality waste water treatment, Definition of BOD and COD. Numerical Problems based on topics.

11. COLLOIDAL STATE OF MATTER :(3 MARKS) Concept of colloidal and its types, Different system of colloids, Dispersed phase and dispersion medium. Methods of preparation of colloidal solutions, Dialysis and electro dialysis. Properties of colloidal solution with special reference to absorption, Brownian Movement, Tyndal effect, Electro phoresis and coagulation. relative stability of hydrophilic and hydrophobic colloids. Protection and protective colloids. Emulsion, Types, preparation, properties and uses. Application of colloids chemistry in different industries.

12. LUBRICANTS :(3 MARKS) Definition, classification, Necessity and various kinds of lubricants. Function and mechanism of action of lubricants and examples. Properties of lubricants, Importance of additive compounds in lubricants, Synthetic lubricants and cutting fluids. Industrial application, its function in bearing.

13. HYDROCARBONS:(4 MARKS) A. Classification and IUPAC nomenclature of organic compounds homologous series (Functional Group) B. Preparation, properties and uses of Ethane, Ethene, Ethyne (Acetylene), Benzene and Toluene.

14. ORGANIC REACTIONS & MECHANISM:(4 MARKS)

1. Fundamental aspects - A. Electrophiles and nucleophiles, Reaction Intermediates, Free radical, Carbocation, Carbanion B. Inductive effect, Mesomeric effect, Electromeric effect.

2.A. Mechanism of addition reaction (Markovnikov's Rule, Cyanohydrin and Peroxide effect),

B. Mechanism of Substitution reactions; (Nucleophilic) hydrolysis of alkyl halide, electrophilic substitution halogenation, Sulphonation, Nitration and Friedel-Craft reaction.

C. Mechanism of Elimination reaction - Dehydration of primary alcohol, Dehydrohalogenation of primary alkyl halide.

15. POLYMERS :(3 MARKS)

1. Polymers and their classification. Average degree of polymerisation, Average molecular weight, Free radical polymerisation (Mechanisms)

2. Thermosetting and Thermoplastic resin - A. Addition polymers and their industrial application- Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon. B. Condensation polymer and their industrial application : Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Decron, Polyurethanes.

3. General concept of Bio polymers, Biodegradable polymers and inorganic polymers(Silicon)

16. SYNTHETIC MATERIALS :(4 MARKS)

1. Introduction - Fats and Oils

2. Saponification of fats and oils, Manufacturing of soap.

3. Synthetic detergents, types of detergents and its manufacturing.

4. EXPLOSIVES: TNT, RDX, Dynamite.

5. Paint and Varnish

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DTT-104: APPLIED CHEMISTRY LAB

LIST OF PRACTICALS

1. To analyze inorganic mixture for two acid and basic radicals from following radicals
A. Basic Radicals : NH_4^+ , Pb^{++} , Cu^{++} , Bi^{+++} , Cd^{++} , As^{+++} , Sb^{+++} , Sn^{++} , Al^{+++} , Fe^{+++} , Cr^{+++} , Mn^{++} , Zn^{++} , Co^{++} , Ni^{++} , Ba^{++} , Sr^{++} , Ca^{++} , Mg^{++} B. Acid Radicals : CO_3^{--} , S^{--} , SO_3^{--} , CH_3COO^- , NO_2^- , NO_3^- , Cl^- , Br^- , I^- , SO_4^{--}
2. To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.
3. To determine the total hardness of water sample in terms of CaCO_3 by EDTA titration method using Eriochroma black-T indicator.
4. To determine the strength of given HCl solution by titration against NaOH solution using Phenolphthalein as indicator.
5. To determine the Chloride content in supplied water sample by using Mohr's methods.
6. Determination of temporary hardness of water sample by O-Henry's method.

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DTT-105: ENGINEERING DRAWING

1. DRAWING, INSTRUMENTS AND THEIR USES. INTRODUCTION TO VARIOUS DRAWING, INSTRUMENTS.

- 1.1 Correct use and care of Instruments.
- 1.2 Sizes of drawing sheets and their layouts.

2. (A) LETTERING TECHNIQUES

2 Sheet

Printing of vertical and inclined normal single stroke capital letters. Printing of vertical and inclined normal single stroke numbers. Stencils and their use.

(B) Introduction To Scales

Necessity and use, R F Types of scales used in general engineering drawing. Plane, diagonal and chord scales.

3. CONVENTIONAL PRESENTATION:

1 Sheet

Thread (Internal and External), Welded joint, Types of lines, Conventional representation of materials, Conventional representation of machine parts.

4.(A) PRINCIPLES OF PROJECTION

1 Sheet

Orthographic, Pictorial and perspective. Concept of horizontal and vertical planes. Difference between I and III angle projections. Di-means coning techniques. Projections of points, lines and planes.

(B) orthographic projections of simple

5 GEOMETRICAL SOLIDS

- a) Edge and axis making given angles with the reference planes. Face making given angles with reference planes. face and its edge making given angles with reference planes.
- b) Orthographic views of simple composite solids from their isometric views.
- c) Exercises on missing surfaces and views

6. SECTION OF SOLIDS

2 Sheet

Concept of sectioning Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others. Cases involving cutting plane perpendicular to one of the reference planes and inclined to the others plane, true shape of the section.

(a) ISOMETRIC PROJECTION.

2 Sheet

Isometric scale Isometric projection of solids.

(b) **FREE HAND SKETCHING**

1 Sheet

Use of squared paper Orthographic views of simple solids Isometric views of simple job like carpentry joints.

7. **DEVELOPMENT OF SURFACES**

Parallel line and radial line methods of developments. Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).

8. **ORTHOGRAPHIC PROJECTION OF MACHINE PARTS:**

Nut and Bolt, Locking device, Wallbracket

9. **PRACTICE ON AUTO-CAD :**

2 Sheet

Concept of AutoCAD, Tool bars in AutoCAD, Coordinate System, Snap, Grid and Ortho mode .Drawing Command - Point, Line, Arc, Circle, Ellipse. Editing Commands - Scale, Erase, Copy, Stretch, Lengthen and Explode. Dimensioning and Placing text in drawing area. Sectioning and hatching. Inquiry for different parameters of drawing.

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I Year II Semester

DTT 201: APPLIED MATHEMATICS –I(B)

1. INTEGRAL CALCULUS - I:

Methods of Indefinite Integration :-

- 1.1 Integration by substitution.
- 1.2 Integration by rational function.
- 1.3 Integration by partial fraction.
- 1.4 Integration by parts.

2. INTEGRAL CALCULUS -II:

- 2.1 Meaning and properties of definite integrals, Evaluation of definite integrals. Integration of special function.
- 2.2 Application : Finding areas bounded by simple curves, Length of simple curves, Volume of solids of revolution, centre of mean of plane areas.
- 2.3 Simpson's 1/3rd and Simpson's 3/8th rule and Trapezoidal Rule : their application in simple cases.

3. CO-ORDINATE GEOMETRY (2 DIMENSION):

- 3.1 CIRCLE : Equation of circle in standard form. Centre - Radius form, Diameter form, Two intercept form.
- 3.2 Standard form and simple properties
Parabola $x^2=4ay, y^2=4ax,$
Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
Hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

4. CO-ORDINATE GEOMETRY (3 DIMENSION):

- 4.1 Straight lines and planes in space -Distance between two points in space, direction cosine and direction ratios, Finding equation of a straight line and Plane (Different Forms),
- 4.2 Sphere $x^2 + y^2 + z^2 + 2gx + 2fy + 2wz=d$ (Radius, Centre and General Equation)

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DTT-202 APPLIED PHYSICS-II

1. Optics:

Nature of light, Laws of Reflection and Refraction, Snell's Law, Interference (Constructive and Destructive), Diffraction and Polarization (Concept Only), Law of Malus and Polaroid's.

2. Introduction To Fibre Optics :

Critical angle, Total internal reflection, Principle of fiber optics, Optical fiber, Pulse dispersion in step-index fibers, Graded index fiber, Single mode fiber, Optical sensor.

3. Lasers and its Applications :

Absorption and Emission of energy by atom, Spontaneous and Stimulated Emission, Population inversion, Main component of laser and types of laser- Ruby Laser, He-Ne laser and their applications. Introduction to MASER.

4. Electrostatics :

Coulomb's Law, Electric field, Electric potential, Potential energy, Capacitor, Energy of a charged capacitor, Effect of dielectric on capacitors.

5. D.C. Circuits :

Ohm's Law, Kirchoff's Law and their simple application, Principle of Wheat Stone bridge and application of this principle in measurement of resistance (Meter bridge and Post Office Box); Carey Foster's bridge, potentiometer.

6. Magnetic Materials and Their Properties:

Dia, Para and Ferro-magnetism, Ferrites, Magnetic Hysteresis Curve and its utility. Basic idea of super conductivity, Meissner's effect.

7. Semiconductor Physics :

Concept of Energy bands in solids, classification of solids into conductors, insulators and semiconductors on the basis of energy band structure. Intrinsic and extrinsic semi conductors, Electrons and holes as charge carriers in semiconductors, P-type and N-type semiconductors.

8. Junction Diode and Transister :

Majority and Minority charge carriers P-N junction formation, barrier voltage, Forward and reverse biasing of a junction diode, P-N junction device characteristics, Formation of transistor, transistor-action, Base, emitter and collector currents and their relationship LED's.

9. Introduction To Digital Electronics :

Concept of binary numbers, Inter conversion from binary to decimal and decimal to binary.
Concepts of Gates (AND, NOT, OR).

10. Non-conventional energy sources:

- (a) Wind energy : Introduction, scope and significance, measurement of wind velocity by Anemometer, general principle of wind mill.
- (b) Solar energy: Solar radiation and potentiality of solar radiation in India, uses of solar energy: Solar Cooker, solar water heater, solar photovoltaic cells, solar energy collector.

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DTT-202 PHYSICS-II LAB

Note: Any 4 experiments are to be performed.

1. Determination of coefficient of friction on a horizontal plane.
 1. Determination of 'g' by plotting a graph T^2 versus l and using the formula $g = 4\pi^2 / \text{Slope of the graph line}$
3. Determine the force constant of combination of springs incase of 1. Series 2. Parallel.
4. To verify the series and parallel combination of Resistances with the help of meter bridge.
5. To determine the velocity of sound with the help of resonance tube.
6. Determination of viscosity coefficient of a lubricant by Stoke's law.
7. Determination of E_1/E_2 of cells by potentiometer.
8. Determination of specific resistance by Carry Foster bridge.
9. Determination of resistivity by P.O.Box.
10. Verification of Kirchhoff's Law.
11. To draw Characteristics of p-n Junction diode.
12. To measure instantaneous and average wind velocity by indicating cup type anemometer/hand held anemometer.

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DTT-203 GENERAL MECHANICAL ENGG.

- 1. FOUNDATIONS AND INSTALLATIONS:** General principles and considerations for machine foundations, vibrations in machine foundations. Layout of foundation bolts, alignment of machines care and precautions to be used in installation of machines, introduction to Indian Standards on machine foundations. Practice in blue printreading for installtions.
- 2. PIPE AND PIPE FITTINGS:** Classification of pipes according to materials used, field of application, IS specifications of water, air and steam pipes, various types of pipe fittings and their applications, laying of pipes, cuttings threading and jointing of pipes.
- 3. BEARINGS AND LUBRICATION:** Various kinds of bearings, bush bearing, ball and roller bearing, thrust bearing and their application in textile machineries. Principle of film lubrication. Various methods of lubrication, lunricants and their properties. Selection of lubricants for various textile machineries.
- 4. POWER TRANSMISSTION & MATERIAL HANDLING:**
 - (a) Different types of Trolleys used in process house.
 - (b) Belt and gear drive. Types of gears, spur gear, bevel gear, helical gear, worm and worm wheel, rack and pinion. Power transmission by belt, chain and gears. Gear drive, application of various kinds of gears and drives in textile machinery. Variable speed drives.
- 5. COUPLINGS, CLUTCHES, ECCENTRICS AND CAMS:** Necessity of coupling, types of couplings, rigid and flexible couplings, universal coupling, fluid coupling. Introduction to common types of clutches, eccentrics and cams, their function and use.
- 6. FUELS AND COMBUSTION :** Common solid, liquid and gas fuels. Their composition, higher and lower calorifics values. Claculation of air required for complete combustion of unitmass/volume. Concept of excess air in bioler furnace combustion. Heat carried away by flew gases. Flew gas analysis by Orsat apparatus. (Simple Numerical Problems) Idea of specific properties of liquid fuels such as knock resistance (Cetane and Octane numbers). Flash point, Flame point, Solidification point.
- 7. THERMODYNAMICS:** Concept of thermodynamic systems and surroundings, Work and its relation to heat. First law of thermodynamics and its application to Constant volume, Constant pressure, Constant temperature and adeabatic processes in dealing with gases and vapours. Representation of these processes in P. V. diagram, calculation of work done. Second law of thermodynamics. Concept of enthalpy, entropy of thermodynamic system. Concept of Heat engine,

Heat pump and refrigerator. Carnot cycle efficiency of heat engine, coefficient of performance of refrigerator and heat pump. Steady state flow process. Its equation and application.

8. STEAM GENERATION AND STEAM GENERATORS: Idea of steam generation from water at 0°C. Pressure and temperature curve of steam generation. Idea of wet, dry saturated and super heated steam. Saturation pressure, temperature, degree of super heat, Enthalpy, Entropy and specific volume of wet, dry saturated and super heated steam. Use of steam tables for simple calculations. Introduction to water tube, fire tube boilers e. g. Lancashire, Babcock Wilcox, Cochran and Simple vertical boilers. Boilers mountings and accessories. Steam traps, Reducers, Expansion bends. Boilers specification. Equivalent evaporation, Boiler efficiency, Draught, Chimney height, Conditions for maximum draught through chimney. Measurement of steam consumption. Simple numerical problems.

9. PUMPS & AIR COMPRESSORS: Elementary knowledge of working of reciprocating, Centrifugal and Vacuum pumps, Blowers and Compressors, Fans and Exhausts. Difference between reciprocating and rotary compressors. Their types and working, Single stage and Multi stage compressors. Power required to drive single stage compressor. Volumetric efficiency and effect of temperature on it. Use of compressed air in textile industry.

10. REFRIGERATION AND AIR CONDITIONING: Meaning of the term refrigeration. Its application, Unit. Refrigeration methods. Bell Coleman air cycle, air refrigerator, Vapour compression refrigeration. Analysis of simple saturated cycle for vapour compression refrigerator. Characteristics of good refrigerants. Properties of common refrigerants such as NH₃, CO₂, SO₂, Freon-12.

Air Conditioning: Meaning of the term and its application. Gas and vapour mixture. Dry and wet bulb temperature, Dew-point, Depression of wet bulb temperature and Depression of Dew-point. Saturated air, specific humidity, relative humidity, Absolute humidity. Humid specific volume, Heat enthalpy of moist air. Use of psychrometric charts and tables. Sensible heating and cooling. Humidification. Dehumidification and their methods. Air conditioning for human comfort. Air conditioning, for summer and winter. Air conditioning round the year, Psychrometric air conditioning. Industrial air conditioning.

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DTT-203 GENERAL MECHANICAL ENGG. LAB

A. Demonstration of the following for study and sketch.

1. (a) Bio Gas Plant.
(b) Wind Mill.
(c) Solar Cooker.
(d) Voltaic Cell Type Solar Energy Converter.
2. Key's, Key ways and Splined shaft e.g. Jib head key, Flat key, Saddle key, Woodruff key, Feather key, Pin key, Splined shaft.
3. Pins- Split pin, Taper cotter type split pin, Cottor pin, Cottor bolts. Foundations Bolts- Lewis rag bolt, Fish tail bolt and Square head bolt.
4. Friction clutch and Coupling- Cone clutch, Plate clutch (Single Pair); Muffcoupling, Flange coupling, Universal or Hook's joint coupling. Flexible coupling- Belt and Pin Type, Coil spring type.
5. Bearings- Plane, Bush, Split step bearings, Ball Roller bearings, Thrust bearings.
6. Gears- Spur gear, Single and Double helical gears, Bevel gears.
7. Gear Trains- Simple spur gear train, Compound gear train, Epicyclic gear train.
8. Compressor and Tension helical springs.
9. Slider Crank Mechanism and Quick Return Mechanism. Performance Practical's:
10. Determination of velocity ratio of a spur gear train.
11. Velocity diagram of a four bar chain mechanism.
12. Performance evaluation of solar cooker.

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DTT-204 TEXTILE FIBERS

1. INTRODUCTION:

- (i) Definition of the Terms: Textile, Fibre, Textile fibre, Staple, Filament, Yarn and thread.
- (ii) Characteristics of a good Textile Fibre:
 - (a) Essential Properties: Length, Strength, Flexibility, Cohesiveness
 - (b) Desirable Properties: Fineness, Resiliency, Uniformity, Porosity, Lusture, Durability and Commerical availability. Importance and usefulness of these properties for textile use. Examples of fibres considerably in these properties

2. CLASSIFICATION AND SOURCES OF TEXTILE FIBRES:

2.1 Definition and Classification of textile fibres.

- (a) Natural Fibres: (i) Cotton: Verities of cottons, Harvesting and Ginning
- (ii) Wool: Classification of wool fibres. The major animal fibres - Mohair, Camel hair,
- (iii) Bast Fibres: Jute, Hemp, Ramie, Sisal and Flax. Plant harvesting, Retting, Breaking and Scutching.
- (iv) Silk: Production of Raw silk, Its physical, chemical and electrical properties and methods of identification, different varieties of silk.
- (v) Grading of Natural Fibres.

(b) Man Made Fibres: Meaning of the term, Introduction to man made fibres such as Viscose Rayon, Acetate Rayon, Cuprammonium Rayon, Nylons (6 and 66), Terelene, Polypropylene. Acrylic, Metallic Fibres. General methods of manufacturing man made fibres viz. Wet, Dry and Melt processes in brief.

3. GENERAL PROPERTIES OF FIBRES:(Natural & Man Made)

- 3.1 Physical properties of fibres length, fineness, crimp, specific gravity, cross sectional shapes, maturity and their improtance in their uses.
- 3.2 Introduction to mechanical properties of fibres: Stress- strain characteristics of various textile fibres. Concept of modulus of Tenacity, Extensibility, Toughness, Work of rupture and Frictional properties.
- 3.3 Brief introduction to optical and electrical properties of fibres.
- 3.4 Comparison of natural and man-made fibres
- 3.5 Use of optical microscope for fibre identification. Other physical mehtod of identification. Chemical methods of their identification - Staining test and Solubility Test.

4. MOLECULAR STRUCTURAL POLYMERIZATION:

- I. Molecular structure, Structure of textile fiber (Wool, Silk, Cotton, Polyester, Viscon Nylon).
- II. Method of polymerisation, Criteria of fiber forming polymer such as Polyesters, Polyamides, Aerylic.

5. UTILISATIONS OF FIBRES:

According to their properties Influence of physical and chemical properties of fibres on their usefulness. Chemical and Physical properties of textile fibres. Introduction to degree of polymerisation, Crystalline and Amorphous region. Viscoelastic behaviour of textile fibres

DTT-204 TEXTILE FIBERS LAB

List of Experiments

1. To distinguish animal fibres from vegetable fibres
 - (i) with an alkali.
 - (ii) with an acid.
2. To distinguish
 - (i) Silk from wool fibres.
 - (ii) Nylon from other fibres.
 - (iii) Polysters from other fibres.
 - (iv) viscose rayon, Cuprammonium rayon and Acetate fibres.
3. To distinguish linen from cotton.
4. To distinguish Orlon Acrylic Fibres from other fibres.
5. To identify textile fibres such as Cotton, Wool, Silk, Jute, Viscos rayon, Polyester, Nylon and Acrylic fibres under microscope and to draw their longitudinal and cross- sectional views.
6. Checking moisture gain of different textile fibres by Shirley moisture meter and by good brand conditioning oven.
7. To check the maturity ratio of cotton fibres by 10% caustic soda solution.
8. To check staple length of textile fibres by hand stapling method.
9. To check trash contents of cotton fibre by Shirley Trash analyser.
10. To identify of textile fibres by
 - (i) Staining Test
 - (ii) Solubility Test.
11. To determine the relative humidity and temperature of room with the aid thermo-hydrograph, whirling hydrometer and dry and wet bulb thermometers.
12. Find out fibre length by Uster stapler.
13. To find out fibre fineness of cotton by A.N. Stapling apparatus.
 14. To do qualitative and quantitative estimation of fibres in a blend.

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DTT-205 TEXTILE CHEMICAL PROCESSING

(A) PREPARATORY PROCESS General Introduction of following :

1. Impurities in raw cotton, jute, wool and silk, their removal.,
2. Cropping, Shearing, Cropping and Gas Singeing
3. Desizing.,
4. Scouring of cotton.,
5. Bleaching of cotton with Sodium Hypochlorite and Hydrogen peroxide.,
6. Scouring of wool.,
7. Carbonisation of wool.,
8. Milling.,
9. Crabbing of wool.,
10. Decatising.,
11. Degumming of silk.,
12. Jute retting.,
13. Heat setting of synthetic and synthetic blends

(B) MERCERISATION

1. Object.
2. Mercerisation process for yarn and cloth.
3. Physical changes in fibres after mercerisation.

(C) DYEING:

1. Classification of dyes according to their mode of application.
2. Dyeing of cotton with direct, sulphur, vat, solubilised vat, reactive.
3. Dyeing of wool and silk.
4. Dyeing of Nylon, acetate and terylene with disperse dyes.
5. Dyeing of acrylics with modified basic dyes.
6. Basic idea about dope dyeing.
7. Introduction of natural dyes- vegetables, minerals and animal dyes, dyeing of wool, silk & cotton with these dyes.

(D) PRINTING

1. Methods of printing: Block, screen, spray and roller printing techniques, limitations of each method and brief study of auxiliaries.
2. Styles of printing : Elementary knowledge of direct. resists, discharge styles of printing.

(E) FINISHING:

1. Object.
2. Ingredients used in brief : Study of durable and water repellent, waterproofing, anticrease, Fireproof.
3. Calenders (Plain, friction, felt) Paper press, shrink proofing (sanforising and London shrink finish) K-D machine.

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DTT-206 WORKSHOP PRACTICE LAB

1. **Carpentry Shop :**

- EX-1 Introduction & demonstration of tools used in carpentry shop and different types of joints, types of wood, seasoning and preservation of wood
- EX-2 Planing and sawing practice
- EX-3 Making of lap joint
- EX-4 Making of mortise and tenon joint
- Ex-5 Making of any one utility article such as wooden- picture frame, hanger, peg, name plate, etc.

2. **Painting and Polishing Shop:**

- EX-1 Introduction of paints, varnishes, Reason for surface preparation, Advantage of painting, other method of surface coating i.e. electroplating etc.
- EX-2 To prepare a wooden surface for painting apply primer on one side and to paint the same side. To prepare french polish for wooden surface and polish the other side.
- Ex-3 To prepare metal surface for painting, apply primer and paint the same.
- EX-4 To prepare a metal surface for spray painting, first spray primer and paint the same by spray painting gun and compressor system.

* The sequence of polishing will be as below:

- i) Abrasive cutting by leather wheel.
- ii) Polishing with hard cotton wheel and with polishing material.
- iii) Buffing with cotton wheel or buff wheel.

3. **Sheet Metal and Soldering Shop :**

- EX-1 Introduction and Types of sheets, measuring of sheets
- EX-2 Study and sketch of various types of stakes/anvil.
- EX-3 Introduction & demonstration of tools used in Sheet metal working shop.
- EX-4 Cutting, shearing and bending of sheet.
- EX-5 To prepare a soap case by the metal sheet.
- EX-6 To make a funnel with thin sheet and to solder the seam of the same.
- EX-7 To make a cylinder and to solder the same.
- EX-8 Preparation of different type of joints such as Lap joint-single seam, double seam. Hemp and wired joints.
- EX-9 To braze small tube/conduit joints.

4. **Fitting Shop, Plumbing Shop & Fastening Shop:**
- EX-1 Study of materials, limits, fits and tolerances.
 - EX-2 Introduction & demonstration of tools used in Fitting Shop.
 - EX-3 Hacksawing and chipping of M.S. flat. Filing and squaring of chipped M.S. job. Filing on square or rectangular M.S. piece.
 - EX-4 Making bolt & nut by tap and die set and make its joints
 - Ex-5 To drill a hole in M.S. Plate and tapping the same to create threads as per need.
 - EX-6 Utility article-to prepare double open mouth spanner for 18" hexagonal head of a bolt.
 - EX-7 Cutting and threading practice for using socket, elbow and tee etc. and to fit it on wooden practice board.
 - EX-8 Study of bib cock, cistern or stop cock, wheel valve and gate valve etc.
 - EX-9 Practice of bolted joints
 - EX-10 To prepare a rivetted joint
 - EX-11 To make a pipe joint
 - EX-12 To make a threaded joint
 - EX-13 Practice of sleeve joint
5. **Foundry Work**
- Ex-1 Study of metal and non metals
 - Ex-2 Study & sketch of the foundry tools.
 - Ex-3 Study & sketch of cupola & pit furnace.
 - Ex-4 To prepare the green moulding sand and to prepare moulds (single piece and double piece pattern sweep mould)
 - Ex-5 Casting of non ferrous (lead or aluminium) as per exercise 3.
6. **Smithy Shop :**
- EX-1 Study & Sketch of Tools used in smithy shop.
 - EX-2 To prepare square or rectangular piece by the M.S. rod.
 - EX-3 To make a ring with hook for wooden doors.
 - EX-4 Utility article-to prepare a ceiling fan hook.
7. **Welding Shop :**
- EX-1 Introduction to welding, classification of welding, types of weld joints.
 - EX-2 Welding practice-gas and electric.
 - EX-3 Welding for lap joint after preparing the edge.
 - EX-4 Welding of Butt joint after preparation of the edge.
 - EX-5 'T' joint welding after preparation of edge.
 - EX-6 Spot welding, by spot welding machine.
8. **Machine Shop**
- EX-1 Study & sketch of lathe machine.
 - EX-1 Study & sketch of grinders, milling M/c, Drilling M/c and CNC Machines
 - Ex-2 Plain and step turning & knurling practice.
 - Ex-3 Study and sketch of planing/Shaping machine and to plane a Rectangle of cast iron.

EVALUATION SCHEME

Diploma - Textile Technology Semester- III

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
DTT-301	Fabric Structure & Analysis	30	70	NA	NA	100
DTT-302	Electrical Technology & Electronics	30	70	25	25	150
DTT-303	Spinning Preparation	30	70	25	25	150
DTT-304	Weaving Preparation	30	70	25	25	150

Semester - IV

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
DTT-401	Industrial Safety	30	70	NA	NA	100
DTT-402	Textile Testing	30	70	25	25	150
DTT-403	Principles of Design And Colour	30	70	NA	NA	100
DTT-404	Introduction To Knitting and Garment Technology	30	70	25	25	150
DTT-404	Introduction To Computer	NA	NA	25	25	50

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DTT301 - FABRIC STRUCTURE & ANALYSIS

1. INTRODUCTION: Introduction to fabric structure. Explanation of woven structure and other fabric structures. e.g. Knitted, Nonwoven, Bonded etc.

- i. Definition of Warp and Weft, Ends and Picks. Determination of warp and weft in a given fabric. Design, Repeat of a design, Draft, Lifting or Peg plan and Denting order.
- ii. Types of drafts used in the manufacture of the fabrics.
- iii. Construction of plain weaves on point or graph paper. Relation of draft, design and peg plan.
- iv. Construction of plain weave and its derivatives in the form of simple Matt or Hopsack and Ribbed Structures.
- v. Various Hopsack or Matt weave designs with warp face, weft face and reversible effects.
- vi. Ornamentation of plain fabrics by different methods.

2. TWILL WEAVES:

Construction of Twill weaves and their classification under the following heads.

- i. Continuous regular twills.
- ii. Pointed twills.
- iii. Combined twills.
- iv. Rearranged twills.
- v. Broken twills.
- vi. Fancy twills.

3. ANALYSIS OF FABRICS:

- i. Analysis of a fabric and its objects. Confirmation of warp and weft and determination of weaving particulars from the given sample of a fabric.
- ii. Procedure for transferring the interlacement of ENDS and PICKS on graph paper for obtaining the design of the given sample of the fabric.

4. SATIN WEAVE: Characteristics and uses of satin and sateen weaves. Construction of regular and irregular satin and sateen.

5. DESIGN: Construction of the following design on point paper along with their draft, peg plan, denting order and weaving particulars.

- i. Diamond and Diaper weaves on pointed draft.
- ii. CREPE weaves by different methods and their characteristics.
- iii. Simple Honeycomb, Brighton Honeycomb, Huck-a back, weaves.
- iv. Mockleno weaves.

6. FABRICS : Calculation of fabric weight (GSM).

7. Miscellaneous : Weaves Design of following weaves only.

- i. Sponge weaves
- ii. Devon huck
- iii. Barley Corn
- iv. Stitched hop-sack
- v. Twilled hop-sack

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DTT-302 ELECTRICAL TECHNOLOGY & ELECTRONICS

1. ELECTRIC INDUCTION: Faraday's Laws of electromagnetic induction. Self and mutual induction. Statically and Dynamically induced e.m.f., Lenz's law. Fleming's left hand and right hand rule.

2. A. C. THEORY: Production of alternating e.m.f. Definition of cycle, Frequency, Amplitude, Time period, Instantaneous, Average, R.M.S. maximum values of sinusoidal wave. Form factor, peak factor. Representation of a sinusoidal quantity by a mathematical expression and phasor, phase and phase difference, Relationship of voltage and current for pure resistance, pure inductance and pure capacitive reactance, impedance. Solution and phasor diagrams of simple R.L.C. series and parallel circuits. Active and reactive power. Significance of P.F.

3. THREE PHASE CIRCUITS: Production of Three phase voltage, advantages of three phase supply. Concept of star and delta connections. Relationship between phase and line values of currents and voltages, Power in three phase circuits, simple numerical problems.

4. MEASUREMENT & MEASURING INSTRUMENTS:

(i) Primary and secondary instruments-Indicating, Recording and Integrated instruments.

(ii) Working principle and construction of the following instruments.

(a) Ammeter & Voltmeter (Moving coil & Moving Iron). Extension of their ranges.

(b) Dynamometer type wattmeter.

(c) Single Phase A. C. Energy Meter.

(iii) Measurement of power in a single phase and three phase circuits by wattmeter, Use of digital multi-meter for measurement of voltage, Current and testing of devices.

5. ELECTRONICS: Basic idea of semi conductors P & N type. Semi conductor diodes, Zener diodes and their applications in rectifiers. Transistors-PNP and NPN-their characteristics and uses at an amplifier (Brief description only). Principle characteristics and application of SCR. Devices like UJT, FET, DIAC, TRIAC (Brief introduction, Introduction to operational amplifier, Introduction to basic logic gates and microprocessors.

6. D. C. MACHINES: D. C. Generator: Working principle, Constructional details, e.m.f. equation, Types of generators and their applications. D. C. Motor: Working principle, Back e.m.f., Types of D. C. motor and elementary idea of their characteristics. Torque equation, Methods of speed control (Description Only).

7. TRANSFORMERS: Working principle and constructional details of a single phase and 3 phase transformers, e.m.f. equation, Losses and efficiency, Cooling of transformers, Elementary idea of auto transformers and welding transformers.

8. SYNCHRONOUS MACHINES:

(a) Alternators: Working principle, Types of alternators, Constructional details, E.M.F. equation, Condition for parallel operation.

(b) Synchronous Motors: Working principle, Constructional details, Vector diagram, Effect of excitation on armature current and power factor, Synchronous condenser.

9. INDUCTION MOTORS:

(a) Three Phase Induction Motors: Working principle and constructional details-Types of induction motors-Slipring and Squirrel cage. Slip in induction motors. Speed torque characteristic, Starting and speed control. Application of induction motors in industry. General faults and their remedies.

(b) Single Phase Induction Motors: Working principle and constructional details and application of single phase motors (Split phase, Capacitor start and Run Motor). A. C. series motors, General faults and their remedies.

10. ELECTRO HEATING: Types of electro heating. Brief description of resistance ovens and induction furnace and core furnaces.

11. ELECTROPLATING: Importance of electroplating, Principle of electroplating and equipment used. Processes used in electroplating, Anodizing.

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ELECTRICAL TECHNOLOGY & ELECTRONICS LAB

1. To change the speed and direction of rotation of d.c. shunt motor by
 - (a) Armature control method.
 - (b) Field control method.
2. To change the speed and direction of rotation of d.c. compound motor by
 - (a) Armature control method.
 - (b) Field control method.
3. To measure the terminal voltage with variation of load current of
 - (a) D.C. shunt generator.
 - (b) D.C. compound generator.
4. To perform load test on a single phase transformer and determine its efficiency.
5. To start and run a induction motor by
 - (a) Star Delta Starter.
 - (b) Auto Transformer Starter.
6. To measure slip of an induction motor by direct loading.
7. To start and change the direction of rotation of an induction motor.
8. To measure transformation ratio of a single phase transformer.
9. To measure power and P.F. in a single phase circuit by Ammeter, Voltmeter and Wattmeter.
10. To measure power and P.F. in a 3 phase/A.C. circuit by two wattmeter method.
11. To calibrate a single phase energy meter at different P.F.'s and different loads.
12. To locate the faults in an electrical machine by a megger.
13. To connect a fluorescent tube and note its starting and running current.
14. To draw characteristics of Silicon Controlled Rectifier (SCR).
15. Testing of electrical devices - Zener, Diode, Transistor, FET, UJT, SCR.
16. Use of operational amplifier as adder, subtractor, comparator, differentiator and integrators.

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DTT-303 SPINNING PREPARATION

1. Introduction to various processes involve in conversion of fiber into yarn with objective.

2. GINNING AND BALING:

- i. Ginning, objects of ginning.
- ii. Classification of ginning machines.
- iii. Description and working of knife roller gins e.g.
Single roller gin, Double roller gin.
- iv. Description and working of Macarthy gins e.g. Single macarthy gin, Double Macarthy gin.
- v. Description and working of saw gins e.g Single saw gin, Double saw gin and Improved saw gin.
- vi. Defects in ginning and their removal.
- vii. Suitability of ginning machines for Indian, American and Egyptian type of cottons.
- viii. Pressing and baling and its importance.

3. PRELIMINARY OPERATIONS:

- i. Mixing and its importance, method of mixing. Advantages and disadvantages.
- ii. Description and working of auto mixer and other modern blenders.

4. OPENING AND CLEANING:

- i. Blow Room: Objects of Blow room . Importance of opening and cleaning. Trash content, opening by nails, air currents and beaters.
- ii. Study of opening and cleaning machines e.g. Blending bale opener, hopper feeders, Porcupine opener, Step cleaner, S.R.R.L. opener, shirley opener, Whit in axiflow machine, Air stream cleaner, Two bladed beater, Three bladed beater and Kirschner beater. Nature of waste extracted in various openers and beaters E. R. M. cleaner and Monocylinder beaters.
- iii. Construction & Working of Bale Plucker.

5. AUXILIARY EQUIPMENT: Use and working of cleaning trunks, Metal separators, Grid bars and leaf bar, Air filters, Condensers, Screens or Cages, Automatic distributors, Conveyors.

6. PREPARATION OF LAP:

- i. Lap forming mechanism, Object and mechanism of Calender Roller and their weightings.
- ii. Objects of picking. single process and scutchers. Selection of machinery according to type of fibre and their suitable combinations. Production and efficiency level obtainable from different blow room machineries under normal mill conditions. Lap rejection. Introduction of modern Blow Room lines like Rieter & Trutzschler.
- iii. Feed regulating motions used in scutcher and their importance with special reference to P.I.V. gears.
- iv. Lap measuring and doffing devices in scutcher.

7. BLOW ROOM:-

- (i) Calculation of production of scutchers and other machines and efficiency.
- (ii) Calculation of lap length and measuring motions.
- (iii) Draft calculations, draft constant, mechanical and actual draft.

8. CARDING:

- i. Objects of carding, passage of material through the card, cards parts and their functions e.g. Feeding system Licker-in, moteknives, Back plate front plate, Cylinder, Flats, Doffer, Under casing etc.
- ii. Theory of carding actions in a revolving flat card.
- iii. Drive of card parts.

9. CARD CLOTHING:

- i. Flexible and metallic card clothing.
- ii. Method of mounting the card with flexible and metallic card clothing.

10. MAINTENENCE:

- i. Card grinding, its objects, Grinding medium, Grinding instruments, Card grinding routine, Flat grinding.
- ii. Card stripping, its objects, effects of stripping stripping equipment's e.g. Plain stripping roll and vacuum stripper.
- iii. DEVELOPMENTS IN CARDING Special features of high production carding machines. Tandem cards with chute feed system. Calculations based on efficiency, draft & production in carding.

11. CARDING CALCULATIONS:-

- (i) Calculation of speeds, drafts and productions of card and drawing machines.
- (ii) Calculation of speeds with respect to various motions of machines.
- (iii) Calculations of production, efficiency, draft and waste percentage.

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SPINNING PREPARATION LAB

LIST OF EXPERIMENTS

1. Operation, Setting and Gauging of blending bale opener(hopper feeder) and To measure the dimension of various important parts of the machine.
2. To calculate the speed of different moving parts of blending bale opener (hopper feeder).
3. Operate and gauge the porcupine opener, step cleaner and other opening machines available in the workshop and also calculate speeds of different moving parts.
4. Operation, setting and maintenance of Kirschner beater and to calculate number of beats per inch of feed material.
5. Adjustments of the weight per yard of the lap and its length.
6. Cleaning maintenance of the feed regulating motion in scutcher.
7. Operate the card machine and produce sliver and to practice piecing lap and sliver.
8. To set and gauge different part of card machine.
9. Calculate the speeds of cylinder, flats, doffer and licker-in and other moving parts of card machine.
10. To calculate all tension drafts, all intermediate drafts, total drafts and draft constants of a card machine.
11. To calculate number of laps consumed per shift of eight hours.

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DTT-304 WEAVING PREPARATION

I. WINDING:

1. Types of packages.
2. Slow speed upright spindle winding machine. (Brief idea)
3. Traversing mechanisms (Rotary, Reciprocating, Multipede)
4. Uses and limitations of slow speed winding machines and essentials of high speed winding machines.
5. High speed and super high speed warp winding machines- Cone winder or rotoconer, Schlaphorst and Auto Coner, B-C spooler
6. Study of various types of slub catchers, traversing devices, tensioning devices, ribbon formation and methods of eliminating them. Full package stop motions. Commonly occurring faults in warp winding, their causes and remedies.
7. Norms for slub catcher setting and tension levels.
8. Different types of high speed pirn winding machines with special reference to Leesona pirn winder.
9. Different types of automatic pirn winding machines with special reference to a modern pirn winder.
10. Bunch building mechanisms.
11. Commonly occurring faults in pirn winding, their causes and remedies.

II. WARPING :

15. Introduction to various ways of warping.
16. Types of creel.
17. Sectional warping machine.
18. Slow speed and high speed beam warping machines.
19. Stop motions. measuring motions and tensioning devices.
20. Commonly occurring faults in warping and their causes and remedies.

III. SIZING:

21. Object of warp sizing.
22. Introduction to various methods of sizing.
23. Study of slasher sizing machine- Warp sheet passage.
24. Detailed study of sizing machine, measuring and marking motion, beam creels, brake guide and tension rollers, sizing and squeezing rollers, drying cylinders, steam trap, sow box construction, leasing rods, adjustable comb, drive, beam pressing motion, slipping friction motion, change wheel drive.
25. Improvements made in the improved type of slashers with conventional cylinders.
26. Multi-cylinders and hot air sizing machines with special reference to drying unit, passage of warp on the machine.
27. Various kinds of sizing ingredients used for cotton, polyester, viscose and their blends.
28. Preparation of size paste for light medium and heavy size M for cotton and man-made fibres blends, Lapping and Migration.
29. Manual and mechanical methods of drawing, and knotting, twisting of warp.

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DTT-304 WEAVING PREPARATION LAB

LIST OF EXPERIMENTS

1. Practice in preparing cones, cheeses and pirns from hanks or ring bobbins.
2. Practice in creeling and preparation of warp on sectional/mill warping machine of required number of ends and width.
3. Practice in creeling and preparation of warpers beam on Slow, Speed warping machine of required warp plan.
4. Practice in creeling and preparation of warpers beam on High Speed warping machine of required warp plan.
5. Practice in operating sizing machine (if working model of sizing plant available).
6. Practice of size paste preparation in laboratory.
7. Practice of making weaver's knot in laboratory.
8. Practice in drafting and denting for different design draft.
9. Study and sketch the important parts of pirn winding machine.
10. Study and sketch the important parts of warp winding machine.
11. Study and sketch the important of sectional warping machine.

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DTT-401 INDUSTRIAL SAFETY

1. INTRODUCTION: Need for Industrial Safety - Legal Humanitarian, Economic and Social consideration. Safe working conditions and productivity, Unsafe conditions and Hazards. Cost of accidents- Direct or Indirect social cost, financial cost. Role of management and workers participation in Industrial Safety. Safety management principles and practices.

2. PRINCIPLES OF ACCIDENT PREVENTION: Definitions - Accident, Injury, Dangereous occurances, Unsafe acts, Unsafe conditions and hazards. Theories of accidents prevention, Principles and methods of accidents preventions.

3. SAFETY ENGINEERING: Safe guarding of machines- Statutory provisions related to safe guarding of machinery and working near unguarded machines. Principle of machine guarding. Ergonomics of machine gaurding. Types of guards and guarding machines in testile industry. ,Incidental safety devices. Accidents and hazards. Guarding of machines and safety precautions in Opening, Cleanning, Carding, Drawing, Combing, Fly frame, Ring frames, Rotors (spinning), Winding, Doubling, Warping, Sizing and Weaving operations.

Material Handling: Ergonomics of material handling, Principles of correct method of lifting objects of different size, shape and weight with safe use of accessories for mannual handling. Safety aspects of design and construction and use of material handling machinery use in textile industry- Lifts, Forks, Motor Troleys, Over head cranes and Chain Pulles. Principle of good illumination at work place and its ecommended minimum standard. Lighting and Colour.

Danger From Electricity: Safe limits of amperage and voltages. Means for cutting over loads and short circuit protection. earth fault protection. Protection of joints and conductors. Fire explosion, Common cause for industiral fire detection and alarm. Knowledge of water system, Carbon Dioxide System, Foam Extinguishers system and Dry Chemical Extinguishing Systems for extinguishing fire, Sprinklers.

4. SAFETY PRECAUTION IN CHEMICAL PROCESSES: Bleaching, Dyeing, Printing, Finishing and Accidental hazards. Chemical hazards in wet processing. Effluent in textile processing. Health and Welfare: Health hazards in Textile industry. Dust and Fly. Noise generated and control measures. Occupational hazards, Occupational diseases. Personal production equipment. Health and welfare measures e.g First Aid Facilities and other welfare measures Hospital, Clinics. Special precautions for specific work environment.

5. SAFETY STATUTES: Employees welfare and legislation. Indian Boiler Act and Regulation. The Water (Control of Pollution) Act and Rules. The Air (Pollution) Act and Rules.

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DTT402 - TEXTILE TESTING

1 SAMPLING AND QUALITY CONTROL: Definition of sample, sample size, sampling Technique, Introduction to quality control, Accuracy of measurement, presentation and analysis of data, SQC charts analysis of defects, difference between average and correlation. Standard deviation and coefficient of variation.

2. IMPORTANCE OF TEXTILE TESTING: Introduction to textile testing, properties of fibres, yarns and fabrics and their relevance in assessing the performance, of textiles during and after manufacture.

3. FIBRE DIMENSIONS:

- i. Fibre Length Measurement - Use of Baer sorter, Fibrograph, Uster-stapler, their principles of operation.
- ii. Fibre Fineness Measurement - By cutting and weighing method, Sheffield micronair, Aerlometer, Maturity of cotton by caustic soda method and by airflow methods.
- iii. Role of Humidity - Absolute Humidity, Relative Humidity, moisture Regain, Moisture content.
- iv. Introduction to H.V.I. (High Volume Instruments)

4. YARN DIMENSIONS:

- i. Measurement of yarn twist by Rock bank twist tester, continuous twist tester and by twist and untwist methods.
- ii. Measurement of yarn diameter by microscope.

5. FABRIC DIMENSIONS:

- i. Measurement of fabric thickness. Measurement of crimp by crimp tester.
- ii. Air permeability of fabrics, its measurement by air permeability tester.
- iii. Crease recovery of fabrics, factors effecting crease recovery, measurements of crease recovery by crease recovery tester.
- iv. Water repellancy tests.
- v. Abrasion resistance test on fabric by Mortindale, Abrasion Tester.

6. TENSILE TESTING OF TEXTILES:

- i. Fibre strength testing by Pressely strength tester, stelometer.
- ii. Yarn strength testing, types of testing machines, single yarn strength testing and Lea strength testing.
- iii. Fabric strength testing by cut strip, grab strip and revealed strip methods.
- iv. Fabric tear testing by tongue tear, trapezoid tear test.
- v. Bursting strength testing by hydraulic strength tester.

7. EVENNESS TESTING

- i. Nature of irregularities - short term, medium term and long term variations, periodic and non periodic irregularities.
- ii. Evenness testing by uster evenness tester and fielden and walker evenness tester.
- iii. Classmate faults and classifaults.

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TEXTILE TESTING LAB

LIST OF EXPERIMENT

1. To find the count of yarn
 - (i) by physical balance
 - (ii) by yarn quadrants balance.
 - (iii) by Bessley yarn balance. and to calculate Coefficient of variation (CV).
2. To calculate yarn count by wrap reel and to calculate C.V..
3. Determine the twist of yarn per inch/per meter in double yarn and its individual components by continuous twist tester and twist and untwist tester.
4. Find out the hank of sliver and roving with the aid of wrap block machine.
5. Find the staple length of fibre by Bare Sorter.
6. Measure fibre fineness by flowing air through a sample of fibre by micronaire.
7. Find out fibre length by analytical digital fibro graph.
8. Find out lea strength of cotton yarn by lea strength tester (Power driven) and CSP.
9. Find the breaking strength of cotton yarn by Ballistic strength testing machine.
10. To find the breaking strength and elongation of single thread of cotton by single thread testing machine (Hand or power driven).
11. Examine the bursting strength of a fabric by bursting strength tester.
12. Find out the relative abrasion properties of fabrics by Martindale abrasion tester.
13. Find the breaking strength of different textile fabrics by means of cloth strength tester (power driven).
14. Measure crimp by Shirley crimp meter.
15. Find out air permeability of fabric by air permeability, tester.
16. Measure crease recovery of fabric by crease recovery tester.
17. Find out fibre strength by stelo-meter.
18. Test of pilling of fabrics by computerized pilling tester.
19. Estimation of final pH value of finished fabric.
20. Test evenness of the yarn by evenness tester,

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DTT-403 PRINCIPLES OF DESIGN AND COLOUR

1. Drawing, tracing, enlarging reducing and transferring of simple and elaborate figures.
2. Sketching of flowers, buds, leaves, geometrical figures and their assembly to obtain an all over effect in fabric.
3. Preparation of sketches for stripped, check, spotted geometric and diaper patterns, suitable for fabrics.
4. Light and pigment theory of colours.
5. Complementary colours, the chromatic circle.
6. Pigment theory of colour. Classification of colours and attributes of the primary and secondary colours. Modification of colors.
7. Colours in combination, general principles of colour contrast, colour harmony, tints, shades and broken hues.
8. Application of colour and weave effect.
9. Development of textile patterns on different basis such as drop, turn over, drop reverse etc. Unit and repeat compared.
10. Transfer of design of motives on graph paper and pilling of weaves according to structure/texture.

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**DTT-404 INTRODUCTION TO KNITTING AND GARMENT
TECHNOLOGY**

- 1. KNITTING :** Introduction and general terms of knitting, Difference in woven and knitted fabrics, properties-knit V/s woven. Warp and weft knitting-mechanism and comparison.
- 2. LOOP FORMATION WITH NEEDLE :** Running position, clearing position, Feeding position, Knocking over positions, Knitting position.
- 3. KNITTING NEEDLES :** Beard, Latch, Compound type of knitting needles, Advantages and disadvantages of beard and latch type.
- 4. STITCHES :**Knit, tuck and floats and its comparison.
- 5. TYPES OF LOOPS :**Types of loops, Classification of weft knitted fabrics - single knit (single jersey), Double knit (double jersey), Factors responsible for production is weft knitting machine.
- 6. GARMENT CLASSIFICATION :** Garment classification for men and women. Fabric selection for garment and properties. Measurement and its importance, Methods of taking important body measurements for gents and ladies garments.
- 7. PATTERNING AND GRADING :** Patterning, importance of paper patterns, Types of patterns, Study of pattern drafting, Identification of fitting problems and its remedy.
8. Types of sleeves, collars, pockets, etc.
- 9. SPREADING, CUTTING AND SORTING :** Objectives of spreading, Methods of spreading, cutting and sorting.
- 10. SEWING TECHNOLOGY :** Classification of stitch, Types of seams sewing tools and part of sewing machine.
11. Stitching defects & their remedies.

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**DTT-404 INTRODUCTION TO KNITTING AND GARMENT
TECHNOLOGY LAB**

LIST OF PRACTICALS

1. Standard measurement for children.
2. Bodies block for
 - i. 3 Years child
 - ii. Grown up woman
 - iii. Grown up man
3. Application of the principle and technique of pattern making for design and construction of -
 - i. Blouse
 - ii. Ladies suit
 - iii. Gents shirts
 - iv. Pant.
4. Drafting of different types of sleeves and collars.
5. Study of construction and working of knitting machine.

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DTT-405 INTRODUCTION TO COMPUTER LAB

LIST OF PRACTICAL'S

1. Practice on utility commands in DOS.
2. Composing, Correcting, Formatting and Article (Letter/Essay/ Report) on Word Processing tool Word and taking its print out.
3. Creating, editing, modifying tables in Database tool.
4. Creating labels, report, generation of simple forms in Database tool.
5. Creating simple spread sheet, using in built functions in Worksheet tool..
6. Creating simple presentation.
7. Creating mail ID, Checking mail box, sending/replying emails.
8. Surfing web sites, using search engines.

EVALUATION SCHEME

Diploma - Textile Technology Semester- V

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
DTT-501	Industrial Management and Entrepreneurship Development	30	70	NA	NA	100
DTT-502	Spinning Technology-I	30	70	NA	NA	100
DTT-503	Spinning Technology-II	30	70	NA	NA	100
DTT-504	Weaving Technology-I	30	70	NA	NA	100
DTT-505	Weaving Technology-II	30	70	NA	NA	100
DTT-506	Lab Spinning-I & II	NA	NA	25	25	50
DTT-507	Lab Weaving-I & II	NA	NA	25	25	50

Semester- VI

		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	SUBJECT NAME	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
DTT-601	Environmental Education & Entrepreneurship Development	30	70	NA	NA	100
DTT-602	Advance Fabric Structure	30	70	NA	NA	100
DTT-603	Process Control in Spinning and Advance Spinning	30	70	NA	NA	100
DTT-604	Process Control in Weaving and Advance Weaving	30	70	NA	NA	100
DTT-605	Project	NA	NA	25	25	50
DTT-606	Industrial Training-4	NA	NA	25	25	50

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DTT 501: INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

1. Principles of Management

- 1.1 Management, Different Functions: Planning, Organizing, Leading, Controlling.
- 1.2 Organizational Structure, Types, Functions of different departments.
- 1.3 Motivation: Factors, characteristics, methods of improving motivation, incentives, pay, promotion, rewards, job satisfaction, job enrichment.
- 1.4 Need for leadership, Functions of a leader, Factors for accomplishing effective leadership, Manager as a leader, promoting team work.

2. Human Resource Development

- 2.1 Introduction, objectives and functions of human resource development (HRD) department.
- 2.2 Recruitment, methods of selection, training strategies and career development.
- 2.3 Responsibilities of human resource management – policies and functions, selection – Mode of selection – Procedure – training of workers, Job evaluation and Merit rating.

3. Wages and Incentives

- 3.1 Definition and factors affecting wages, methods of wage payment.
- 3.2 Wage incentive – type of incentive, difference in wage, incentive and bonus; incentives of supervisor.
- 3.3 Job evaluation and merit rating.

4. Human and Industrial Relations

- 4.1 Industrial relations and disputes.
- 4.2 Relations with subordinates, peers and superiors.
- 4.3 Characteristics of group behavior and trade unionism.
- 4.4 Mob psychology.
- 4.5 Grievance, Handling of grievances.
- 4.6 Agitations, strikes, Lockouts, Picketing and Gherao.
- 4.7 Labour welfare schemes. 4.8 Workers' participation in management.

5. Professional Ethics

- 5.1 Concept of professional ethics.
- 5.2 Need for code of professional ethics.
- 5.3 Professional bodies and their role.

6. Sales and Marketing management

- 6.1 Functions and duties of sales department.
- 6.2 Sales forecasting, sales promotion, advertisement and after sale services.
- 6.3 Concept of marketing. 6.4 Problems of marketing.
- 6.5 Pricing policy, break even analysis.
- 6.6 Distribution channels and methods of marketing.

7. Labour Legislation Act (as amended on date)

- 7.1 Factory Act 1948.
- 7.2 Workmen's Compensation Act 1923.
- 7.3 Apprentices Act 1961. 7.4 PF Act, ESI Act.
- 7.5 Industrial Dispute Act 1947.
- 7.6 Employers State Insurance Act 1948.
- 7.7 Payment of Wages Act, 1936.
- 7.8 Intellectual Property Rights Act

8. Material Management

- 8.1 Inventory control models.
- 8.2 ABC Analysis, Safety stock, Economic ordering quantity.
- 8.3 Stores equipment, Stores records, purchasing procedures, Bin card, Cardex.
- 8.4 Material handling techniques.

9. Financial Management

- 9.1 Importance of ledger and cash book.
- 9.2 Profit and loss Account, Balance sheet.
- 9.3 Interpretation of Statements, Project financing, Project appraisal, return on investments.

10. Entrepreneurship Development

- 10.1 Concept of entrepreneur and need of entrepreneurship in the context of prevailing employment conditions.
- 10.2 Distinction between an entrepreneur and a manager.
- 10.3 Project identification and selection.
- 10.4 Project formulation.
- 10.5 Project appraisal.
- 10.6 Facilities and incentives to an entrepreneur.

11. Fundamental of Economics

- 11.1 Micro economics.
- 11.2 Macro-economics.

12. Accidents and Safety

- 12.1 Classification of accidents based on nature of injuries, event and place.
- 12.2 Causes and effects of accidents.
- 12.3 Accident-prone workers.
- 12.4 Action to be taken in case of accidents with machines, electric shock, fires and erection and construction accidents.
- 12.5 Safety consciousness and publicity.
- 12.6 Safety procedures.
- 12.7 Safety measures – Do's and Don'ts and good housing keeping.

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DTT-502 SPINNING TECHNOLOGY-I

1. DRAWING:

- i. Objects of drawing, Construction of draw frame, its parts and their functions and passage of material through drawing frame.
- ii. Drawing rollers, Top and Bottom drafting rollers and their construction.
- iii. Principles of doubling and drafting.
- iv. Principles deciding the gauging and setting of drafting rollers. Roller settings for Indian, American and Egyptian cottons and man-made fibres. Roller pressure and its distributions.
- v. Importance of stop motions, study of electrical stop motions. Study of different drafting systems e.g. 2/2, 2/3, 3/5, 4/4 and 4/5 drafting systems.
- vi. Importance and study of Auto levellers
- vii. Special features of high speed draw frame, their names and different models.
- viii. Defects and remedies in drafting operating.
- ix. Calculations based on draft & production in draw frame.

2. COMBING -

- (i) Importance and use of combing. Cottons commonly used for combing and the yarns for which cotton is generally combed.
- (ii) Sliver lapper - Its object, construction and methods of feeding slivers to the sliver lapper.
- (iii) Draft and production, lap winding and roll setting of sliver lapper.
- (iv) Ribbon lapper - Its importance and construction, draft and production of ribbon lapper. Stop motion of ribbon lapper.
- (v) Construction and working of super lapper and lap former machine..
- (vi) Drawing lap formation combination its advantages. Study of automatic lap former.
- (vii) Modern methods of lap preparation, Its historical development, Comber noil and degree of combing, subdivision of combing and brief combing cycle, detailed study of Nasmith comber, Modern trends in combing and control of comber waste, study of modern comber and study of various parts and their functions, settings, speeds and mechanism.
- (viii) Calculation Noil% regarding production of comber.

3. ROVING :

- (i) Objects of roving study and construction and functions of various parts of speed frame/simplex and passage of material through them.
- (ii) Drafting mechanism, drive of drafting rollers, pressure on drafting rollers.
- (iii) Basic principles of Cone drum.
- (iv) Twisting and method of twisting, study of motions required for twisting flyer and its functions.
- (v) Winding : Principle of winding, bobbin leading and flyer leading winding, drive of winding mechanism. Traverse motion given to hobbins, building motion and its functions.
- (vi) Differential motion, its objects and working principles, study of differential motion.
- (vii) Calculation pertaining to production, twist, draft and winding.

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DTT-503 SPINNING TECHNOLOGY-II

1. RING SPINNING:

- (i) Objects of ring frames, construction and functions of various parts of ring frames Viz Rings, Spindles, Balloon Control Rings, Spacer, Aprons, Cots, Spindle tape, Rising and Falling Lappets.
- (ii) Traveller, Function of Traveller, Traveller type, size and No.
- (iii) Passage of material through ring frames.
- (iv) Twisting of Yarn, Effect of Twist, Twist terminology, Concept of twist multiplier, Factors affecting twist in spinning.
- (v) Principles of Roller drafting and Drafting systems e.g. Casablanca apron drafting system, W.S.T., S.K.F.,m and their advantages, break draft and its effect.
- (vi) Building motion, its objects construction and working,
Types of builds (i) Warp (ii) Filling (iii) Combination
- (iv) Reverse.
- (vii) Drive of ring frame, Different systems of Ring Frame drive like Group drive, Single Motor Drive, VPS (Variable Pitch Seath) and Dual Drive.
- (viii) Causes of end breaks in ring frame.
- (ix) Limitation of Large Package Spinning.
- (x) System of waste collection at ring frames and different types of spinning wastes.
- (xi) Factor's responsible for less efficiency in spinning.
- (xii) Limitations of ring spinning
- (xiii) Yarn faults and their remedies.
- (xiv) Recent developments in Ring Spinning.

RING FRAME CALCULATION:

- (i) Calculation of Draft twist, Production and efficiency for different counts and diameter of Yarns.
- (ii) Calculation of balancing machines used in spinning processes for various counts-Spin Plan.
- (iii) Concept of average mill count and 20's conversion.
- (iv) Traveller speed, traveller lag calculation.

2. DOUBLING:-

- (i) Object of ring doubling, doubling and its effects, dry and wet system of doubling. Detailed study of Ring Doubler and Two for One Twister - Basic principles, Machine geometry, Different types of T.F.O. twister. Production and efficiency calculation and Advantages over one for one twister.
- (ii) Fancy doubling Yarns, their objects and their production Viz. Ply Yarn, Tape Yarn, Core Yarn and Sewing Threads.
- (iii) Production of folded yarn, cord and tape yarn production.
- (iv) Calculation of folded yarns.

3. REELING BUNDLING:

Object and terminology, Types of Reels, Construction and working of Reels, Different system of Reeling. Yarn bundling and balings.

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DTT-504 WEAVING TECHNOLOGY – I

1. HANDLOOM WEAVING : Its main features, Its uses. Difference in quality of product woven by Handloom and that by Powerloom. Special features of handloom woven fabrics. Description and working of Handloom machines showing all necessary parts and their working.

2. PLAIN LOOM

(i) History of weaving.

(ii) Terminology.

(iii) Power loom - primary, Secondary and auxiliary motions of plain tappet loom.

3. A. SHEDDING :

1. Different types of healds, reeds and shuttles.

2. Different types of sheds, their merits and demerits.

3. Tappet shedding mechanism and warp easing mechanism.

4. Introduction to various types of tappets.

5. Designing of negative shedding tappets.

6. Merits and demerits of tappet shedding.

7. Heald reversing motions.

8. Timing of shedding motions. Early and late shedding.

9. Commonly occurring faults in shedding mechanism their remedies.

10. Calculations pertaining of healds and reed.

B. PICKING AND BEATING UP

(i) Introduction to various parts of motions and their setting/adjustments.

(ii) Mechanism of over pick and under pick motions their merits and demerits - Methods of varying the intensity of picking in each case. Velocity of shuttle.

(iii) Causes and remedies of shuttle flying and trapping.

(iv) Remedies of early and late picking.

(v) Beating up motion : Mechanism of beating motion. Eccentricity of sley.

C. TAKE-UP MOTIONS AND LET OFF MOTIONS

(i) Various types of take up motions.

(ii) Study of five and seven wheel intermittent positive take up motion and calculations.

(iii) Continuous positive take up motion.

(iv) Negative take up motion.

(v) Let off motions:

1. Various types of let off motions.

2. Study of negative let off motions.

3. Study of semi-positive & positive let off motion

4. WEFT STOP MOTIONS

- (i) Various types of weft stop motions.
- (ii) Study of side weft fork motions.
- (iii) Study of centre weft fork motions.
- (iv) Break motion, Anticrack motion.

5. WARP PROTECTORS

A. (i) Study of loose reed motion.

(ii) Study of fast reed motion.

B. OTHERS (i) Temples.- Types of Temples

(ii) Shuttles guards.

6. CALCULATION (i) Calculation pertaining to costing of : yarns, resultant count, average count, moisture content, tape length.

(ii) Calculation of wt- of warp, weight of weft, wt/sq. yard etc.

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DTT-505 WEAVING TECHNOLOGY – II

1. DOBBIES :

- (i) Classification of dobbies.
- (ii) Study of single lift bottom closed shed centre closed shed, semi open shed, open shed dobbies with special reference to Keighley and Climax dobbies.
- (iii) Positive dobbies (any two dobbies).
- (iv) Timing and setting of dobbies.
- (v) Method of preparing dobbie lattice and Pattern cards
- (vi) Synchronising of dobbie with drop box.
- (vii) Cross border dobbie.
- (viii) R. H. and L. H. dobbie, dobbie mounting, dwell of dobbie.
- (ix) Commonly occurring faults in mechanism and their remedies.
- (x) Calculation relating to production, efficiency yarn requirements, waste etc for looms.

2. MULTIPLE BOX MOTIONS

- (i) Introduction to multiple box motions.
- (ii) Kinds of multiple box motions.
- (iii) Study of Cowburn and Peck's box motion its card saving device, safety devices.
- (iv) Study of Knowle's box motion.
- (v) Study of pick at will box arrangement.
- (vi) Study of non skip and skip motions.
- (vii) Preparation of chain for given pattern of weft.
- (viii) Commonly occurring faults in boxes of the above mechanisms and their remedies.

3. JACQUARD:

- (i) Introduction to figure weaving.
- (ii) Kinds of jacquard.
- (iii) Double lift single cylinder jacquard.
- (iv) Double lift double cylinder jacquard.
- (v) Cross border jacquard.
- (vi) Single lift single cylinder jacquard
- (vii) Twilling jacquard.
- (viii) Gauge and Leno jacquard.
- (ix) Fine pitch Jacquard.
- (x) Pressure harness.
- (xi) Sectional harness.
- (xii) Harness building.
- (xiii) Harness ties.
- (xiv) Card cutting, Piano card cutting machine and lacing of cards
- (xv) Repairing, adjustments and timing of the above machines.

(xvi) Commonly occurring faults in jacquard weaving and their remedies.

4. AUTOMATIC WEAVING:

- (i) Feeler, cutter and three pick try motion.
- (ii) Warp stop motion.
- (iii) Pirn changing mechanism.
- (iv) Shuttle protector.
- (v) Shuttle changing mechanism.
- (vi) Centre selvedge motion.

5. GENERAL:

- 1. Difference between cotton weaving and synthetic blends weaving.
- 2. Cloth defects, their causes and remedies.

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5.6 SPINNING TECHNOLOGY-I & II LAB

SPINNING TECHNOLOGY-I

List of Experiments

1. Calculate the draft constant, twist constant, spindle speed, front roller speed and production per spindle from machine particulars in the workshop.
2. To prepare sliver laps on the sliver lap machines and to gauge the rollers.
3. To calculate all tensions drafts, Intermediate drafts, Total draft, Draft constant and Production of sliver lap machine.
4. Operate the ribbon lap machine and prepare laps and gauge the rollers of the machine.
5. To calculate all tensions drafts, Intermediate drafts, total drafts, Draft constant and Production of ribbon lap machine.
6. To operate and set timing of comber and prepare sliver.
7. Set and gauge various parts of comber.
8. To calculate and analyse the comber waste percentage practically and evaluate the combing efficiency.
9. To calculate all tension drafts, Intermediate drafts, Total drafts and Drafts constant and production of comber machine.
10. Operate the fly frame with material and practice the piecing of roving.
11. Set building motion and traverse motion according to hank of roving.
12. Calculate spindle speed, front roller speed and rate of traverse from machine particulars.
13. To Gauge the drafting rollers and to practice changing of draft change pinion (DCP), lifter change, change wheel, twist wheel, ratchet wheel and winding wheel.
14. Level the bobbin rail and adjust the lift of fly frame.
15. Set the spindle and bolster and footstep bearing and clean and lubricate the machine (Flyframe).
16. To calculate production per shift of eight hours and time required to fill one can of 3000 meters sliver capacity on card machines
17. Operate the drawing machine and to practice piecing of sliver.
18. Setting and gauging of drafting rollers for given staple length of fibres.
19. To lubricate and put the stop motion in proper working order of draw frame.
20. To calculate the speed of different moving parts of a draw frame machine
21. To calculate the production on draw frame per delivery per machine per shift of eight hours

SPINNING TECHNOLOGY-II

List of Experiments

1. To make cheeses on parallel winding machine and calculate drum speed and production.
2. Operate the doubling machine and produce folded yarn and to calculate twists constant, TPI, Spindle speed and production.
3. Make hanks of yarn on reeling machine by straight reeling method and cross reeling method
4. Make bundles of yarn on the bundling machine.

5. To Calculation twist constant and draft constant and production from machine particulars of ring frame.
6. Operate the machine and produce yarn.
7. Gauge the Spindle and Lappets.
8. To learn the changing the draft change pinon and twist wheel, traveller and ratchet wheel at ring frames and mount the spindle tape and set it for 'S' and 'Z' twist.
9. Set the building motion according to the count of yarn.
10. Set the top arm and gauge the top and bottom rollers.
11. Carryout the maintenance of ring frame practically.
12. To calculate spindle speed , Twist Constt, TPI & Production of ring doubler.
13. To learn about making spin plan, taking breaking study, snap study of idle spindles, labour allocation in Ring frame dept on assumption basis.
14. To study traveller speed & doff weight of Ring frame.
15. To calculate count cint. & strength cint. in Ring yarn on assumption basis.

DTT-507 WEAVING TECHNOLOGY I & II

LIST OF EXPERIMENTS

1. Practice of beam gaiting.
2. Practice of fixing and tuning the whole loom to run for perfect weaving.
3. Dismantling of various parts of doobby, their sketching and resetting.
4. Timing and adjustment of doobby for giving connection of T lever, Arm and Eccentric provided on the shaft. Barrel setting.
5. Practice of preparing doobby lattice.
6. Practice of operating loom fitted with doobby and weaving of cloth.
7. Practice of mending broken ends after levelling the healds.
8. Finding and removing faults in doobby weaving.
9. Fixing and tuning of drop box motion.
10. Chain preparation for different weft plans.
11. Sketching of various parts of drop box motion

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DTT601: ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT

1. INTRODUCTION:

- Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigation, urbanization, road development and other engineering activities and their effects on ecology and eco system, Mining and deforestation and their effects. - Lowering of water level , Urbanization.
- Biodegradation and Bio-degradability, composting, bio remediation, Microbes
- Use of bio pesticides and bio fungicides.
- Global warning concerns, Ozone layer depletion, Green house effect, Acid rain ,etc.

2. POLLUTION: Sources of pollution, natural and man made, their effects on living environments and related legislation.

2.1 WATER POLLUTION: Flow Measurement: Hot Wire Anemometry, Laser Doppler Velocity meter, Rota meter Temperature Measurement: Thermometers, bimetallic thermocouples, thermostats and pyrometers. Measurements of Force, Torque: Different types of load cells, elastic transducers, pneumatic & hydraulic systems. Seismic instruments Measurements of Acceleration, and Vibration: Accelerometers vibration pickups and decibel meters, vibro-meters.

- Factors contributing water pollution and their effect.
- Domestic waste water and industrial waste water. Heavy metals, microbes and leaching metal. - Physical, Chemical and Biological Characteristics of waste water.
- Indian Standards for quality of drinking water.
- Indian Standards for quality of treated waste water.
- Treatment methods of effluent (domestic waste water and industrial/ mining waste water), its reuse/safe disposal.

2.2 AIR POLLUTION: Definition of Air pollution, types of air pollutants i.e. SPM, NOX, SOX, GO, CO₂, NH₃, F, CL, causes and its effects on the environment.

- Monitoring and control of air pollutants, Control measures techniques. Introductory Idea of control equipment in industries i.e.

A. Settling chambers

B. Cyclones

C. Scrubbers (Dry and Wet)

D. Multi Clones

E. Electro Static Precipitations

F. Bog Fillers. - Ambient air quality measurement and their standards.

- Process and domestic emission control

- Vehicular Pollution and Its control with special emphasis of Euro-I, Euro-II, Euro-III and Euro IV.

2.3 NOISE POLLUTION: Sources of noise pollution, its effect and control.

2.4 RADISACTIVE POLLUTION: Sources and its effect on human, animal, plant and material, means to control and preventive measures.

2.5 SOLID WASTE MANAGEMENT: Municipal solid waste, biomedical waste, Industrial and Hazardous waste, Plastic waste and its management.

3. LEGISLATION:

Preliminary knowledge of the following Acts and rules made there under-

- The Water (Prevention and Control of Pollution) Act
- 1974. - The Air (Prevention and Control of Pollution) Act - 1981.
- The Environmental Protection (Prevention and Control of Pollution) Act -1986. Rules notified under EP Act - 1986 Viz.
 - # The Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000
 - # The Hazardous Wastes (Management and Handling) Amendment Rules, 2003.
 - # Bio-Medical Waste (Management and Handling) (Amendment) Rules, 2003.
 - # The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002.
 - # Municipal Solid Wastes (Management and Handling) Rules, 2000.
 - # The Recycled Plastics Manufacture and Usage (Amendment) rules, 2003.

4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA):

- Basic concepts, objective and methodology of EIA.
- Objectives and requirement of Environmental Management System (ISO-14000) (An Introduction).

5. DISASTER MANAGEMENT: Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power, Causes and Hazards, Case study of Tsunami Disaster, National policy

- Its objective and main features, National Environment Policy, Need for central intervention, State Disaster Authority
- Duties and powers, Case studies of various Disaster in the country, Meaning and benefit of vulnerability reduction, Factor promoting vulnerability reduction and mitigation, Emergency support function plan. Main feature and function of National Disaster Management Frame Work, Disaster mitigation and prevention, Legal Policy Frame Work, Early warning system, Human Resource Development and Function, Information dissemination and communication.

Department of Textile Technology
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P.K. University, Shivpuri (MP)
III Year VI Semester

DTT-602 ADVANCE FABRIC STRUCTURE

1. WELTS AND PIQUES: Varieties and characteristics of piques and welts, methods of embellishing pique fabrics, their structure, plain pique, backed pique, fast backed welts and waved pique.

2. BED FORD CORDS: Plain faced bedford, wadded bedford cord, bedford cord arranged with alternate picks and cords containing odd number of ends. twill-faced bedford cord.

3. BACKED FABRICS (WARP AND WEFT): Backed fabrics, wadded warp and weft backed fabrics, their beaming and drafting procedure.

4. EXTRA WARP AND WEFT: Principles of figuring with extra warp and weft one and one i.e. pick and pick wefting, two and two wefting. Methods of disposing of extra threads on the back of the fabric. Spot figures with extra warp and extra weft arranged in a particular order.

5. DOUBLE CLOTH: Construction of double and multiple cloths on design paper, their beaming, drafting and pegging. Types of double structures viz.

(i) Tubular Fabrics.

(ii) Double-faced Fabrics.

(iii) Fabrics opening to double the width.

(iv) Double equal plain fabrics.

(v) Centre stitched double cloth.

6. GAUZE AND LENO FABRICS: Structure of gauze and leno fabrics, bottom and top douping. Different types of sheds formed in gauge and leno fabrics, comparison of gauge and leno. Combination of gauge and other weaves, striped patterns.

7. TURKISH TOWELLING: Principles of formation of pile, construction of three, four, five and six pick terry fabrics their methods of drafting and denting. Terry ornamentation.

8. SPECIAL LENO STRUCTURES: Cellular tennis shirting, Russian cords, Net Lenos, combination of gauge and leno with extra warp and extra weft. Two doup pattern, Distorted weft and styles.

9. PILE FABRICS: Designing of plain warp pile fabrics in detail. Reversible warp pile structure and double plush weaving. Weft pile fabrics, twill back velveteens, Corduroy fabrics, weft plushes. Varieties of suiting fabrics. Distinctive features and modification of toilet fabrics.

10. LAPPET AND SWIVEL WEAVING: Introduction Only

11. Analysis of Fabrics.

12. CAD in Textiles : Introduction only

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DTT-603 PROCESS CONTROL IN SPINNING AND ADVANCE SPINNING

(1) PROCESS CONTROL IN SPINNING:

1. Control of mixing quality and cost, waste and cleaning in blow room and carding, comber waste yarn realisation.
2. Measurements and analysis of productivity.
3. Control of yarn count, strength, evenness and imperfections, statistical interpretation of data.
4. Breakage and efficiency studies and their analysis.
5. Case studies.

2. ADVANCE SPINNING:

- (i) Open end spinning, Different styles of open end spinnings such as Rotor spinning, Airjet spinning, Friction spinning, Bob text spinning, Electrostatic spinning, Properties of open end spinning yarns defects of Open end spinning yarns.
- (ii) Tow To Top conversion processes- Stretch breacking and cutting methods. Tow characteristics, Different methods of tow to yarn conversion. Principle of texturing, its importance and application, Method of texturing, Heat setting and texturing, False twisting, Development of false twisting machines, Stuffer box crimping. Principle of draw texturising machines involved e.g. Draw twister for texturised yarn, Draw winder, Cone winder, Up twister. Edge crimping, Principle of air bulking and properties of air textured yarns.
- (iii) Brief study of different processes involved in wollen and worsted spinning Properties wollen and worsted yarns.
- (iv) Waste Spinning- Meaning, Technique and scope of waste spinning.
- (v) Principle & Working of compact spinning.

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DTT-604 PROCESS CONTROL IN WEAVING AND ADVANCE WEAVING

(1) PROCESS CONTROL IN WEAVING:

1. Measurement and control of quality and productivity and waste in winding, warping, sizing, drawing-in and weaving.
2. Common faults in weaving and their analysis and remedies.
3. Breakage and efficiency studies and their analysis and their improvement.
4. Case studies

(2) ADVANCE WEAVING:

- (i) Principle of operation for shuttle less looms comparative study of new systems of weft insertions, Weft storage unit.
- (ii) Unwinding tensions - Package build and colour selection mechanisms.
- (iii) Types of Solvedge and their formation.
- (iv) Theoretical aspects of airjet, waterjet, projectile rapier system of weft insertion.
- (v) Principle of multi-phase weaving.
- (vi) Industrial fabrics/Technical fabrics – Their construction and details and uses - such as parachute fabrics, conveyor belts, coating fabrics, aramid fabrics, soil fabrics (cloths), belting cloths, filter fabrics, geo textiles and non-wovens.

DTT-605 PROJECT

Two periods per week are allotted for project work in the final year of the course. In classroom students (i) be encouraged and helped for developing new designs in yarn/weave (ii) be given clear idea of establishing a spinning/weaving unit of given size beginning from selection of site, deciding type of building construction/shed, units of machinery required, their layout. Fundamental requirements of spinning and weaving mill organization. Deciding number of workers and their type. Process control in spinning and weaving departments, elements of costing and costing procedures in various sections, Factors affecting productivity and efficiency of men and machines, sources of finance and development of resources.