

DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY (DHTT) Semester based Syllabus

SEMESTER-I

1.1 ENGLISH – I

UNIT – I:

Formation of words - clause and Sentences.

Kinds of Sentence – Simple, Compound & Complex Sentences.

UNIT – II:

Parts Of Speech, Noun, Pronoun, Adjective, Verb, Auxiliary Verbs, Modals.

UNIT-III:

Adverb, Preposition, Conjunction – Interjection, Article, Active and Passive voice, Direct and Indirect Narration.

UNIT – IV:

Vocabulary – Meaning for the given words, Synonymous and Antonymous.

UNIT – V:

Letter writing, Paragraph writing, Comprehension.

1.2 APPLIED MATHEMATICS

UNIT – I:

1. Matrices and Determinants.
2. Determinants up to 3rd order.
3. Properties of Determinants.
4. Solutions of simultaneous equations using Cramer's rule.
5. Properties of Matrices.

UNIT- II:

1. Trigonometry – Introduction.
2. Trigonometry ratios – Multiple angles.
3. Trigonometry identities – Simple problems Only.
4. Properties of triangles- Sine formulae – Cosine formulae and Projection formulae – problems.

UNIT- III:

1. Differential Calculus.
2. Differentiations – Concept – Differentiation of standard function
3. Differentiations of Sum, Product & Division.

UNIT- IV:

1. Integral Calculus – Introduction.
2. Integration – Basic Definition.
3. Definite Integrals and properties.
4. Integration by substitution.
5. Integration by parts.

6. Simple Problems.

UNIT- V:

1. Linear equation involving two variables only.
2. Solution of simultaneous linear equations involving two variables.
3. Co- linear points.
4. Statistics – Introduction.
5. Frequency distributions Mean, Median, Mode, Standard Deviation and C.V. %.

1.3. APPLIED PHYSICS

UNIT – I: UNITS AND DIMENSIONS

1. M.K.S system and C.G.S. system.
2. Fundamental quantities and units (S.I. system)
3. Derived quantities and units (S.I. system)
4. Supplementary SI units
5. Dimension and Dimensional formula.
6. Application of Dimensional equations with examples, limitations.

UNIT- II: HEAT

1. Expansion of Solids, Liquids and gases.
2. Definition of Co-efficient of linear, superficial and cubical expansion and derivation of their relationship.
3. Volume and pressure coefficients of Expansions of gases.
4. Boyle's law, Charle's law and derivation of ideal gas equations.

UNIT- III: LIGHT AND SOUND

1. Optical instruments – Simple Microscope
2. Derivation of expressions for magnification of image at near point and at far point'
3. Refractive index, Critical angle and Total internal reflection, Conditions for TIR
4. Derivation for the refractive index of prism
5. Definition of oscillation, period, frequency, amplitude , velocity and wave length
6. Definition of Traverse wave and longitudinal wave, progressive wave and stationary wave.
7. Free, damped, and forced vibrations.

UNIT- IV: ELECTRICITY

1. Definitions of Ohm's law-Resistance, conductance & inductance.
2. Resistance in series and parallel – EMF- Potential difference – Coulumb's law for electricity charges.
3. Electric potential capacity capacitors in series and parallel.
4. Kirchoff's laws.
5. Explanation and application of Kirchoffs laws to Wheatstone's Bridge.

UNIT-V:ELECTRONICS

1. Conductors. Insulators and Semi Conductors.
2. Intrinsic and Extrinsic Semi Conductors – P type and N type.
3. P – N Junction diode – forward bias and Reverse bias diode as a half wave rectifier and full wave rectifier.

4. PNP and NPN transistor and their characteristic.
5. Logic gates – OR, AND and NOT only.

1.4 APPLIED CHEMISTRY

UNIT – I:

1. Occurrence and classification of water and expressions of water hardness.
2. Disadvantages of hard water (with special focus of its use in textiles).
3. Softening of hard water by Clark's, Permutit and Calgon methods.
4. Oxidation and reduction – definition and examples.
5. Oxidising and reducing agent and their functions.
6. Expressions of Acidity and Alkalinity – pH and pOH scale.

UNIT-II:

1. Properties and uses of Sodium Hydroxide, Sodium Hydrosulphite Sodium carbonate, Hydrochloric Acid, Sulphuric Acid and Rongolite C (Sodium Sulphoxylate Formaldehyde).
2. Properties and uses of Sodium sulphate (Glauber's salt).

UNIT-III:

1. Study of the large scale manufacturing process, properties and uses of Hydrogen peroxide, Bleaching power, Sodium Hypo Chlorite and Sodium Chlorite.
2. Brief introduction of Equivalent Weight, Atomic Weight and Molecular weight.
3. Introductory notes on Solute, Solvent, Solutions and Solubility.

UNIT-IV:

1. Classification and IUPAC Nomenclature of Organic Compounds.
2. Properties and uses of Benzene, Aniline, Naphthalene and Anthracene.
3. Conversion, General reaction and two examples in each of addition, substitution, esterification, hydrolysis, and diazotization.

UNIT-V:

1. Definition and uses of soap and detergents.
2. Carbohydrates- definition, classification.
3. Polymers and their classification
4. Brief study of Polymerisation Reaction (emphasis on Addition and Condensation Polymerisation.)
5. Chemical Structure and properties of Textile fibers viz. Cotton, Wool, Silk, Polyester, Nylon and Acrylic.

1.5 CHEMISTRY PRACTICE

1. Demonstration of the use of various apparatus of Chemistry lab.
2. Demonstration of safe handling of Chemicals.
3. Demonstration of weighing technique.
4. Demonstration of measurement of pH by Universal Indicator.
5. Demonstration technique of volumetric analysis.
6. Preparation of standard solution required for volumetric analysis.
7. Acid- Alkali titrations.
8. Estimation of strength of Oxalic acid in terms of normality and g/l by using ferrous sulphate and potassium permanganate solutions.

9. Estimation the strength of Ferrous Ammonium Sulphate in terms of normality and g/l using Potassium Permanganate solution.
10. Estimation of the strength Bleaching Powder.
11. Estimation of the strength Hydrogen Per oxide.
12. Estimation of Hardness of water by EDTA method.
13. Preliminary testing to detected Acid and Basic radicals.
14. Detecting Acidic Radicals from given salt (Except Interfering Radicals)
15. Detecting the Basic form the given salt.
16. Analysis of the given salt for ACIDIC / BASIC Radicals.

1.6 HANDLOOM WEAVING PRACTICE – I

1. Sketching and Familiarization of different Parts of handloom –The student shall draw the respective diagrams and acquire the basic knowledge about their functions.
2. Sketching and Practice of Various Knots and piecing – The Students Shall draw the diagrams of various knots practice of various Knots and piecing.
3. Bobbing winding for warp Preparation – The students shall be provided with yarn, Bobbin and chakra to practice the bobbin winding.
4. Pirn winding for weft – The students shall be provided with yarn, prins and chakra to practice the pirn winding.
5. Warping – The students shall be practice on sectional warping machine.
6. Preparation of Design, draft and tie- up – plan- The students shall create designs and prepare it's drafting plan and tie-up plan.
7. Practice of weaving plan design fabrics.

1.7 ENGINEERING DRAWING PRACTICE

1. Introduction, use and Practice of Engineering drawing instruments and different grades of pencils.
2. Use of I.S. Code and sheet layout of Engineering drawing.
3. Practice of Engineering lettering and numbering.
4. Use and meaning of different lines.
5. Practice and use of dimensioning.
6. Use and construction of Scales like Plane scale, Diagonal scale, Comperative scale, Reducing and increasing scale, Physical signification of Representative fraction.
7. Basic idea of Theory of projection.
8. Projection plane.
9. Use and practice of First angle projection.
10. Use and Practice of Third angle projection.
11. Practice of Projection of point.
12. Practice of projection of Straight line.
13. Practice of projection of square plane.
14. Practice of Geometrical construction (supported drawings)
15. Practice of Geometrical construction of polygons.
16. Practice of construction of drawing of Cube, Prism, Pyramid, Cone and Cylinder in first position.
17. Practice of construction of drawing of Prism and Pyramid in first position with side inclines to V.P.
18. Practice of drawing of Prism and Cylinder in second position.
19. Idea and practice of Isometric projection of solids – Terminology , Isometric view and Isometric projection.

SEMESTER-II

2.1WEAVING TECHNOLOGY & TEXTILE CALCULATIONS – I

UNIT-I:

1. Different forms of yarn packages like hanks, cones, cheeses, and spools – purpose and use.
2. Essential characteristic of warp and weft.
3. Yarn Preparatory processes.
4. Warping and its requirements.
5. Peg Warping, Vertical warping and sectional warping.
6. Objective and importance of sizing of cotton yarn.
7. Ingredients used in size mixture and their functions.
8. Various forms of sizing- hang sizing and street warp sizing.
9. Illustrative Size Recipe for cotton, Viscose and Polyester- cotton blends.
10. Ideal sizing.
11. Common defects during sizing- causes and remedies.

UNIT-II:

1. Evolution of handlooms
2. Various Parts of a handloom and their function.
3. Type of handloom – Throw Shuttle handloom, Fly shuttle handloom – Pit loom & Frame loom.
4. Passage of warp in a fly shuttle handloom.
5. Motion of handloom- Definitions of primary, Secondary & Auxiliary Motions.
6. Different type of shed formations – Centre Close shed, Bottom Closed shed, Top close shed, Open- shed and Semi – open Shed.
7. Shedding mechanism of a handloom using treadles and Heald Reversing motions- Roller system, Pulley system and jack and lam- rod system.

UNIT-III:

1. Picking mechanism of a handloom.
2. Type of shuttles – Throw shuttle, Fly shuttle and Roller shuttle- Design and Suitability.
3. Beating of – Closed and beating and crossed shed beating.
4. Different type of reed- Bamboo reed, pith bound steel reed and all metal steel reed- Suitability.
5. Let of Motion Handlooms- Ratchet and Pawl, rope and weight, rope - lever and weight.
6. Take up motion in handlooms – Poker rod and ratchet & pawl.
7. Auxiliary Motions of a handloom – Temple motion and terry motion.

UNIT-IV:

1. Introduction to numbering yarn.
2. Indirect system of numbering of yarn – New English Cotton, New French, Decimal, Metric, Worsted, Woolen Yorkshire, Linen, Spun silk and Spun Rayon.
3. Direct System of numbering of yarn – Denier and Flax/ Jute/ Hemp.
4. Evolution of Universal system of numbering – Tex and its derivatives like milli – tex and kilo.

UNIT-V:

1. Determination of Conversion Factor.
2. Conversion of Count of yarn- Indirect to Indirect.
3. Conversion of Count of yarn – Direct to Direct.

4. Conversion of Count of yarn – Indirect to Indirect.
5. Conversion of Count of yarn – Direct to Indirect.

2.2 FABRIC STRUCTURE AND ANALYSIS - I

UNIT – I:

1. Classification of fabrics – Woven, Non-woven, Knitted and Braided fabrics.
2. Classification of woven fabrics – simple, compound and complex.
3. Graphical representation of structure of a woven fabric.
4. Interlacement diagram – Warp way and weft way.
5. Study of plain weave.
6. Creation of draft, Peg plan and tie-up from the weave repeat.
7. Ornamentation of plain fabrics Study of Derivative structure of Plain- Regular and irregular Warp rib, Regular irregular Weft rib and Regular and irregular Hopsack weaves.
8. Catch – cord technique for weaving rib and hop-sack.

UNIT-II:

1. Study of twill weave up to 12 threads.
2. Classification of twills – warp faced twill, weft faced twill and equal faced twill.
3. Angle of inclination of twill diagonals.
4. Influence of the twist direction of yarn over prominence of twill diagonals.
5. Study of derivatives of twill weaves – Wavy twill, Herringbone, Transposed Twill, broken twill and curved twill, Elongated twill and Shaded twill.

UNIT-III:

1. Diamond Twill.
2. Twill dice check.
3. Diaper.
4. Regular and irregular satin upto 12 threads.
5. Regular and irregular sateen upto 12 threads.
6. Satin dice check.
7. Study of Honey comb weaves – Ordinary Honey comb and Brighton Honey Comb- cell formation – suitability for toweling purpose.

UNIT-IV:

1. Study of Huck -a –Back weaves.
2. Study of mock leno weaves.
3. Study of corkscrew weaves.
4. Study of crepe weaves – Construction upon sateen base, by combination of floating weaves with plain thread, by reversing and by insertion of one weave over another.

UNIT-V:

1. General principles of cloth analysis.
2. Method of identifying the direction of warp and weft.
3. Assumption of count of Warp and weft.
4. Determination of ends / inch and Pick / inch.
5. Estimation of Warp & Weft Crimp.
6. Analysis of fabric for cloth particular: plain, twill, satin, and honey cyomb (long cloth, cotton sarees,

cotton dothies, gauze fabrics, bed sheets and bed spreads.

2.3 MATERIAL SCIENCE AND ENGINEERING MECHANICS

UNIT-I:

1. Introduction to Engineering materials.
2. Ferrous metals properties and uses of grey cast iron, low, medium, high carbon steel, stainless steel, nickel steel, tungsten steel and non ferrous metals.
3. Timber – defects of timber, uses of timber, seasoning of timber.
4. Plastic- properties and uses of thermo plastic and thermosetting plastic.
5. Paint and varnishes – constituents of paint and varnishes, characteristics of paint and varnishes, uses of paint and varnishes.
6. Lubrication of oil- properties and uses of lubrication oil.

UNIT-II:

1. Force, effect of force, characteristics of force and its graphical representation.
2. Co- planar concurrent forces- resultant and equilibrant, resolution of force.
3. Parallelogram law of forces, triangle law of forces and polygon law of forces.
4. Lami's theorem, condition of equilibrium and states of equilibrium.
5. Introduction to Dynamics – speed, velocity and acceleration.
6. Equations of linear motion.
7. Motion under gravity and acceleration due to gravity.
8. Newton's three law of motion.

UNIT-III:

1. Introduction to Strength of materials.
2. Property of elastics, plastics Fiber Forming Polymers.
3. Simple stress and strain – Elastic limit, Hook's law and Young's modulus.
4. Stress strain diagram for ductile material.
5. Introduction to Work, Power and Energy.
6. Definition of work, power and energy.
7. Unit of work, power and energy.
8. Horse power, brake horse power and frictional loss.
9. Law of conservation of energy of freely falling body.

UNIT-IV:

1. Metal joining processes- Soldering, brazing, gas welding and electric arc welding.
2. Metal removal processes – engine lathe, drilling machine, shaping machine planning and milling machine.
3. Metal casting processes – two box sand moulding and casting.
4. Metal forming processes – hand smithy, powder forging and rolling.
5. Carpentry processes – Planning, sawing and types of joinery.

UNIT-V:

1. Introduction to friction and transmission.
2. Types of belt drive – open and cross belt drive.
3. Introduction to lifting machine

4. Definition of machine, mechanical advantage, velocity ratio and efficiency.
5. Study of simple machine like wheel and axle, levers, Screw jack and winches.
6. Single fixed pulley, single moving pulley and pulley blocks.

2.4 FIBER AND YARN TECHNOLOGY

UNIT-I:

1. Definition of Textiles Fiber.
2. Classification of Textile fibers.
3. Requirement of basic properties and textiles fibers.
4. Physical, Chemical properties and end uses of Cotton, Wool, Silk, and Jute.
5. Ring spinning Technology for manufacture of Carded and Combed Cotton Yarn.
6. Brief study of methodology in Blowroom, Carding, Drawframe, Unilap, Comber, Fly frame and Ring frame.

UNIT-II:

1. Flow Charts for Manufacturing of Viscose rayon, Acetate rayon and Polyester.
2. Physical, Chemical properties and end uses of Viscose rayon and Acetate rayon.
3. Flow Charts for Manufacturing of Nylon-6, Nylon-66, Poly- Acrylic and Polyester.
4. Physical, Chemical properties and end uses of Nylon-6, Nylon-66 and Poly- Acrylic.

UNIT-III:

1. Woolen and worsted yarn manufacturing Technology.
2. Silk rearing, Manufacturing of filament silk and spun silk yarns.
3. Production of Double/ Twisted yarn.
4. Reeling, building and baling of yarn.

UNIT-IV:

1. Open end spinning.
2. Friction spinning.
3. Air Jet spinning.
4. Comparison of ring spun yarn with open- end spun yarn.

UNIT-V:

1. Preparation, Production and uses of Crepe yarn, Spot yarn, Crimped yarn, textured yarn, Chenille yarn, industrial yarns, Tyre cords and Sewing threads.
2. Production of Blended Yarn (Polyester : Cotton, Polyester :Viscose and Polyester: Wool Blends)
3. Introduction of various techniques of fabrics production such as knitting, non woven and carpets.
4. Process of Garment making – pattern making, cutting, stitching & finishing of garments.

2.5 OVERVIEW OF DESIGN & PRINCIPLES OF TEXTILE DESIGNING PRATCIE

LIST OF ACTIVITIES

1. Practice on drawing lines – Horizontal lines – Curve – lines – Lines of Growth and grace – Thick and thin lines – Double lines – Broken lines- Oblique lines or lines of movement – Accented lines.
2. Practice of Foliage drawing – small plants and flowers – creepers – birds – animals – clouds – still water.
3. Light Theory of Color.
4. Pigment Theory color.

5. Practice and understanding Light and color phenomena, colour vision complementary colours, The chromatic circle, Attributes of colour, Properties of colour – Hue- value- intensity, Modification of colours- Hue- Tone- Tint-Shade- Coloured greys- Colour schemes- Triadic colour factors- light, distance- special illusions – colour relationship, colour contrast – Monochromatic contrast – Polychromatic contrast – successive contrast – simultaneous contrast – contrast of hue – contrast of tone and colour harmony – Basic of colour harmony – Harmony of analogy – harmony of contrast – Relative spaces occupied by the colours .
6. Drawing elements of Textiles Design – motif- unit figure- design repeat.
7. Design setting using Textile Design Bases – Rectangular, Diamond, Ogee and diagonal bases – Distribution of unit figures – principles of simple drop and reverse drop – Sateen Distribution – All over effects.
8. Creation of layout of a ready to wear textile products – Saree, Dhoti, Lungi, Shawl etc.
9. Layout of Home furnishing – Bedspread, Bed sheet, Table cover, Pillow cover, Window curtains, Door curtains, ladies top, baby wears etc.
10. Preparation of an album containing picture / sample of Traditional Indian Textiles and their documentation.
11. Preparation of an album containing picture / samples of Indian Brocade fabrics and their and their documentation.
12. Preparation of an album containing picture / samples of Indian Sarees and their and their documentation.

2.6 HANDLOOM WEAVING PRACTICE – II

1. Preparation of Design, draft and tie- up plan- The students shall create design and prepare it's drafting plan and tie- up plan.
2. Drawing- in and Denting – The students shall practice the drawing – in as per the draft given to them.
3. Tie-up and Loom setting – The students shall tie- up and set the loom according to the design in the allotted Loom.
4. Weaving- The Students shall practice the art of weaving in the allotted Loom.
5. Setting- up of shedding mechanism – The students shall align the shedding mechanism for smooth weaving in the allotted Loom.
6. Setting- up of picking mechanism – The students shall align the picking mechanism for smooth weaving in the allotted Loom.
7. Gaiting – up – The students shall practice gaiting – up of warp in the Loom allotted.

2.7 COMMUNICATION SKILLS PRACTICE

1. Fundamentals of Communications –
 - a) Definition of communication, importance of communication, models of communication.
 - b) Type of communication – verbal and Non-verbal.
 - c) Barriers in communication and overcoming barriers.
 - d) Process of communication – horizontal, vertical, upward, downward.
 - e) Essential elements of good communication.
2. Spoken Communication –
 - a) Importance of spoken communication.
 - b) Designing receiver oriented Message.
 - c) Dyadic communication (face to face).

- d) Telephone interview, Instructions & Dictations.
- 3) Practice on verbal and nonverbal communication- Speaking, Reading, Writing and Listening Skills.
- 4) Written Communication –
 - a) Fundamentals of sentence structure.
 - b) Writing good paragraphs and Official / Demi- official Letters.
 - c) Paragraph on current topics / theme like (a) Technology (b) Science (c) Economy (d) Politics (e) Social (f) General.
- 5) Fundamentals of Technical Writing-
 - a) Special features of technical writing, the word choice.
 - b) Developing clarity and consciousness.
- 6) Making Oral Presentation-
 - a) Functions of presentations.
 - b) Defining objectives.
 - c) Collection & organization of material.
 - d) Body language.
 - e) Effective delivery techniques.
- 7) Using Audio Visual Aids for Effective Communication.
 - a) The role of technology in communication.
 - b) The role of audio visuals in communication.
 - c) Multicultural Communication.
 - d) Oration (ex-tempore speech).
 - e) Practice of Group Discussions.
- 8) Grammar
 - a) Functional grammar and usage, articles and prepositions, tenses.
 - b) Punctuation and common errors.
 - c) Extension of vocabulary, reading comprehension, listening comprehension.

SEMESTER-III

3.1 WEAVING TECHNOLOGY & TEXTILE CALCULATIONS - II

UNIT – I:

1. Handloom dobbies – Lattice doobby, barrel doobby and bottom closed shed doobby – Mechanism, Working principles and suitability.
2. Design and essential features of a pit loom – Structural Loom, Lay-out and relationship between the loom design and the product manufactured.
3. Design and essential features of a frame loom – Structural Loom, Lay-out and relationship between the loom design and the product manufactured.
4. Lay- out and design of an Industrial handloom weaving unit.

UNIT-II:

1. Modern Cone Winding machine – Mechanism and working principles.
2. Modern High Speed Beam warping Machine – Mechanism and working Principles.
3. Types of Creels.
4. Modern High Speed multi- cylinder sizing machine- mechanism and working principles.
5. Modern High Speed Automatic Pirn Winding Machine – Mechanism and Working Principles.
6. Introduction to Power- loom- Primary, Secondary and Auxiliary motions of a power-loom.
7. Tappet Shedding and Reversing motions- Plain, Twill and Satin.
8. Early Shedding, late Shedding.

UNIT-III:

1. Designing of tappets – Plain, Twill and satin upto 5 shafts.
2. Picking Mechanism – Scope of Over- pick and Under- Pick Mechanism.
3. Cone Over- pick mechanism- Mechanism and working principles.
4. Parallel motion Under-pick mechanism- Mechanism and working principle.
5. Early picking and Late picking.
6. Beating- up Mechanism- Eccentricity of sley.
7. Timing and Synchronisation of primary motions.
8. Seven wheel take- up motion.
9. Negative let-off motion.

UNIT-IV:

1. Expression of Count of folded yarns.
2. Contraction during twisting- Expression of Contraction as a percentage to original length.
3. Determination of Equivalent/Resultant Count of folder yarns.
4. Amount of component threads in folded yarn and costing.
5. Average Count of warp – combination of different counts, material and system of counting.
6. Reed Count- Dents per liner space and groups of dents per linear space models.
7. Dents per linear space- Stockport.
8. Relation between Reed count, Number of ends per dent, cloth width, reed width and ends per inch.

UNIT-V:

1. Driving of loom- Single motor and Counter- Shaft arrangements.
2. Gear Calculations – Spur Gear (Simple and compound arrangements), Driver and Driven Wheels, Direction of rotation – Worm and Worm wheel.
3. Pulleys and belts- Flat belt and v belt – Slippage and Efficiency – Simple and Compound Arrangements.

3.2 FABRIC STRUCTURE AND ANALYSIS – II

UNIT-I:

1. Simple colour and weave effect; continuous line effects, hound's tooth patterns, bird's eye and spot effects, hairline stripes, step patterns, and all over effects.
2. Combination of weaves – Twill and plain, mock leno and plain, Honey comb and plain – stripe and check effect by these combinations – Care about beaming.
3. Distorted thread effects – Salient feature – warp and weft distortion – Design draft, and peg plan.

UNIT-II:

1. Bedford cord weaves- Salient features – plain faced bed ford cord (Regular and Alternate pick principle),

twill faced bed ford cord, wadded bed ford cord, and Crepon Bedford cords- Design, draft, denting, peg plan and thread interlacing diagram.

2. Welt structures- salient features and Manufacturing techniques – Ordinary welt, Wadded welts (Loose back and fast back)- Design, draft, denting, Peg plan and thread interlacing diagram.

UNIT-III:

1. Double width plain cloth – Interlacement diagram and its graphical representation.
2. Plain Tubular cloth – Interlacement diagram and its graphical representation.
3. Double cloth – Classification on the basic of techniques of achieving unison.
4. Self- stitched double cloth – two methods of stitching – selection of appropriate stitching points- reversible and non - reversible varieties using twill, satin, and sateen- Design, draft, peg plan, thread interlacement diagram and beaming.

UNIT-IV:

1. Centre stitched double cloth – Two methods of stitching (using additional series of warp or weft) – reversible and non- reversible varieties using twill, satin, and sateen – Design, draft, peg plan, thread interlacement diagram and beaming.
2. Thread interchanging double cloth – warp thread interchanging double cloth and weft thread interchanging double cloth – reversible and non – reversible varieties using twill, satin, and beaming.
3. Cloth interchanging double cloth – Design, draft, peg plan, thread interlacement diagram and beaming using plain and twill – Creation of column stripes, row stripes and check effects using warp and weft patterning.

UNIT-V:

1. General principles of cloth analysis.
2. Extracting weave repeat.
3. Extracting warp and weft pattern.
4. Analysis of fabrics like plain, twill and satin – Extracting fundamental details.
5. Constructions Particulars of long cloth, cotton sarees, cotton dhoties, Honey- comb towels, gauze fabrics, bed sheets and bedspreads.

3.3 CHEMICAL PROCESSING OF TEXTILES – I

UNIT- I:

1. Morphological and Chemical aspects cotton, Composition of Raw Cotton.
2. Dry preparatory process viz. Mending, Stitching, Shearing & Cropping, Spotting and singeing.
3. Need for preparation of Grey Goods for dyeing and printing.
4. Desizing, Scouring and Bleaching of Cotton with Hypo Chlorites, hydrogen, peroxide and Sodium Chlorite Covering process conditions.

UNIT-II:

1. Description & working of Singeing M/c, Kier, and J-Box.
2. Preparatory Process sequence for different Cotton materials (for White, to be Dyed in pale & medium shades and/or to be printed goods.)
3. Definition of Dyes, Pigment, Auxochrome and Chromophore.
4. Basic concepts involved in dyeing such as solubility and affinity. Concept of Banneddyes.

UNIT-III:

1. Basic parameters of dyeing viz. percentage of shade, percentage of exhaustion, percentage expression and effect of M:L ratio.
2. Methods of dyeing cotton with Direct, Azoic and Sulphur dyes, Process conditions (Effect of electrolyte, Time, Temperature and pH etc.) and functions of chemical used.
3. After treatment of cotton dyed with direct dyes with the cationic dye fixing agent for improvement in Fastness Properties.

UNIT- IV:

1. Classification of Vat dyes.
2. Chemistry and Methods of their application on Cotton.
3. Process of Dyeing of cotton with Solubilised Vat dyes.

UNIT-V:

1. Brief concept of Reactive dyes.
2. Methods of cotton dyeing with Hot Cold Brands Reactive Dyes.
3. Introduction to Bi- Functional Reactive dyes.
4. Process conditions and Process control parameter applicable to above dyeing.

3.4 ECOLOGY & POLLUTION CONTROL IN TEXTILES INDUSTRY

UNIT- I:

1. Environmental Pollution & its harmful effects on Human beings, Vegetation Inert material and Physical features of Atmosphere.
2. Introduction of types of pollution viz. Air, Water, Soil, Noise, Radio active / Radiation Pollution.
3. Overview of Environmental Pollution in Textile Industry.
4. Brief description on Pollution in Textiles.

UNIT-II:

1. Air- Pollution – Definition, Causes of Air Pollution.
2. Classification, Sources & Characteristics of Important Air Pollution.
3. Sources of Air Pollution in a Textiles Mill.
4. Air quality standards, Out door air pollution & In door air pollution.

UNIT-III:

1. Water Pollution.
2. Classification of water pollutions, Various Sources of waste water in wet processing.
3. Characteristics of waste water – e.g. SS,TDS , DO, COD, BOD, etc.
4. Water conservation in Textile Industry, Various methods of waste reduction.

UNIT-IV:

1. Methods of wastewater / effluent treatment i.e. Physical, Chemical and Biological treatment.
2. Brief description of design and working of effluent treatment plant.
3. Methods of removal of colour from Textiles Dye House waste.
4. Tolerance level of Efluents in Wet Processing of Textiles.
5. Impact of water pollution of Man, Marine life & Ecology of Textiles, Solid wastes, its sources and sledge treatment.

UNIT-V:

1. Noise Pollution.
2. It's effects and Preventive & Control of Noise pollution in Textile Industry.
3. New Challenges towards achievements of rigid standards in Textile Processing Effluents.
4. Eco- standards and Eco- Labels for Textiles.
5. ISO 14000 & current environment related Textile Industry.

3.5 CHEMICAL PROCESSING PRACTICE- I

1. Demonstration on Identification of fiber by using Burning and Microscopic test and its conformation with solubility test.
2. Demonstration on Analysis of given blended sample for its blend percentage (P/V and P/C).
3. Desizing of the given cotton fabric by using Enzyme Desizing method.
4. Scouring of given cotton fabric / yarn and calculate the percentage weight loss.
5. Bleaching of the given cotton fabric by using Bleaching Powder.
6. Bleaching of the given cotton fabric by Hydrogen Per Oxide.
7. Bleaching of the given cotton fabric by Sodium Chlorite.
8. Practice on numerical problems on basic concept of dyeing.
9. Dyeing of the given sample of cotton with Direct dyes.
10. After treatment of direct dyed cotton sample with cationic dye fixing agent to improve its washing fastness.
11. Dyeing of the given sample of cotton with Azoic dyes.
12. Dyeing of the given sample of cotton with Sulphur dyes.
13. Dyeing of the given sample of cotton with cold brand Reactive dyes.
14. Dyeing of the given sample of cotton with Hot brand Reactive dyes.
15. Dyeing of the given sample of cotton with Vat dyes.
16. Dyeing of the given sample of cotton with Solubilised Vat dyes.

3.6 POWER-LOOM WEAVING PRACTICE- I

1. Sketching and familiarization of different parts of semi-automatic loom – The students shall draw the respective diagrams and acquire the basic knowledge about their functions.
2. Sketching and familiarization of different parts of power-loom – The students shall draw the respective diagram and acquire the basic knowledge about their functions.
3. Sketching and familiarization of primary motions of semi-automatic loom and power-loom – The Students shall draw the respective diagram and acquire the basic knowledge about their principle of working.
4. Dismantling and erection of shedding mechanism – The students shall dismantle, erect and set the timing of shedding motion in semi- automatic looms / power- looms.
5. Dismantling and erection of picking mechanism – The students shall dismantle, erect and set the timing of picking motion in semi- automatic looms / power-looms.
6. Winding and warping – The students shall practice bobbin winding, pirn winding and warping.
7. Weaving – The students shall practice weaving in semi- automatic looms/ power looms.

3.7 COMPUTER APPLICATION PRACTICE

1. Introductory notes on Evolution of Computer, Parts of Computer, Fundamentals of Computers, Hardware viz. Input processing and output devices, composition of standard Key-Boards.
2. Introductory notes on Application Software viz. MS office (Word, Excel, Access and Power point.)

3. Demonstration on Putting on and off the Computer.
4. Demonstration on Accessories viz. Notepad, WordPad, paint.
5. Demonstration on commands and shortcuts used in MS Word.
6. Practice on Using commands and shortcuts used in MS Word.
7. Practice on Using Accessories.
8. Demonstration on commands and shortcuts used in MS Excel.
9. Practice in Using commands and shortcuts used in MS Excel.
10. Demonstration on functions used in MS Excel.
11. Practice on Using functions used in MS Excel.
12. Demonstration in commands and shortcuts used in MS PowerPoint.
13. Practice on Using commands and shortcuts used in MS PowerPoint.
14. Practice on preparation of Presentation using PowerPoint.
15. Demonstration on commands and shortcuts used in MS Access.
16. Practice on Using commands and shortcuts used in MS Access.
17. Practice on Mail Merge.
18. Practice on Application of Data Base.
19. Introductory notes on Internet, Surfing, Downloading, E-Mail, ID creation, Attachments.
20. Minor Project work e.g. Preparation of presentation on a given topic, Creation of Data Base for a given Application such as preparation of Mark Sheet, issue of Course Course completion certificates etc.

SEMESTER-IV

4.1WEAVING TECHNOLOGY & TEXTILE CALCULATONS- III

Unit – I:

1. Warp protection motions – Loose Reed and Fast Reed Motions – Mechanism and working principles.
2. Weft Detection motion – Side weft fork and Center weft fork motions – Mechanism and working principles.
3. Power – loom dobbies – Climax Dobby – Mechanism and working principle.
4. Lattices and Pegging.

Unit-II:

1. Multiple Box Motion – Drop Box – Mechanism and working principle.
2. Automatic Power- looms – Introduction.
3. Mechanism Warp Stop Motion.
4. Weft Replenishment Mechanism – Shuttle Changing & Cop Changing.
5. Brief description about loom width, speed and suitability of power – looms for manufacturing various \ varieties of cloth.
6. Preparation of lay-out for a loom shed.

Unit-III:

1. Mill Warping Calculations – Efficiency, Production, creel capacity, number of back beams, amount of yarn, wastage and production planning.

Unit-IV:

1. Sectional warping calculations – Creel capacity, No. of sections, No. of patterns per section, width of warp, and total no. of ends.
2. Sizing calculations – size pick-up, efficiency, production and production planning.

Unit – V:

1. Yarn Winding Calculations- Cone, Cheese and pirn- Efficiency, Production, and Production planning.
2. Loom shed Calculation – Efficiency, Production, and Production planning.

4.2 FABRIC STRUCTURE AND ANALYSIS - I

UNIT-I:

1. Wadded Double Cloth – Warp wadding and weft wadding – Design, draft, peg plan, thread interlacement diagram and beaming using plain and twill.
2. Treble width plain cloth – Interlacement diagram and its graphical representation.
3. Treble cloth – Design, draft, peg plan, thread interlacement diagram and beaming using twill, satin, and sateen.
4. Backed cloths – Salient features.
5. Warp backed cloth – reversible and non – reversible warp backed cloth using twill, satin and sateen- Design, draft, peg plan, thread interlacement diagram and beaming.

UNIT-II

1. Weft wadded warp backed cloth – reversible and non- reversible using twill, satin, and sateen- Design, draft, peg plan, thread interlacement diagram and beaming.
2. Weft backed cloth – reversible and non- reversible weft backed cloth using twill, satin and sateen- Design, draft, peg plan, thread interlacement diagram and beaming.
3. Warp wadded weft backed cloth - reversible and non- reversible using twill, satin and sateen- Design, draft, peg plan, thread interlacement diagram and beaming.
4. Imitation backed cloth – Imitation warp backing and imitation weft backing – Design, draft, peg plan, thread interlacement diagram and beaming.

UNIT-III:

1. Pile fabrics – Salient features.
2. Classification of pile fabrics; Loop pile and cut pile; warp pile and weft pile.
3. Warp pile fabrics produced with the aid of wires; loop piles and cut piles production techniques - Design, draft, denting, peg plan, thread interlacement diagram and beaming.
4. Simultaneous insertion of pick and wire and the twin shed formation technique.
5. Techniques of anchoring of piles – By using two beams for ground ends and by using 'W' binding - Design, draft, denting, peg plan, thread interlacement diagram and beaming.
6. Warp pile fabrics produced on face-to-face principle – Single shuttle and double shuttle weaving – Design, draft, denting, peg plan, thread interlacement diagram and beaming.
7. Weft piles – Salient features – Manufacturing technique and process involved.

UNIT-IV:

1. Allover velveteen and corduroys – Structure, Graphical representation, Design, draft, denting, peg plan, thread interlacement diagram and beaming.
2. Chenille Axminster pile fabrics manufactured using handlooms – technique of fabric manufacture and designing.
3. Terry piles – Salient features – Technique of Pile formation.
4. Classification of terry pile structure – 3 pick, 4 pick, 5 pick and 6 pick – Thread interlacement diagram and graphical representation.

5. Terry pile on one side of fabric only and on both sides – structure, thread interlacement diagram, graphical representation, drafting, denting and peg- plan.
6. Stripe and check effects – Terry pile on one side and both sides – fabric pattern and its design, draft, denting, peg plan, thread interlacement diagram and beaming.

UNIT-V:

1. Analysis of various types of fabrics.
2. Extracting fundamental details like count of warp and weft, ends and picks per unit space; warp and weft crimp and weave repeat.
3. Estimation of weight per square meter and amount of yarn requirement.

4.3 CHEMICAL PROCESSING OF TEXTILES- II

UNIT- I:

1. Morphological and chemical aspects of Wool and Silk.
2. Composition of raw wool and Silk.
3. Methods of scouring Wool (Suint, Emulsion, Solvent and Freezing.)
4. Milling of Woollens (Dolly machine)
5. Methods of Degumming silk with soap, mild alkali and enzymes.

UNIT-II:

1. Bleaching of wool with Hydrogen peroxide.
2. Bleaching of silk with Hydrogen peroxide.
3. Setting process for woollens viz. Potting, Crabbing and Decatising.
4. Need of preparatory treatment for important Man Made fibers viz. Polyester, Nylon and Acrylic.
5. Methods of Scouring and Bleaching for Polyester, Nylon and Acrylic.

UNIT-III:

1. Methods of dyeing of Wool and Silk with Acid, Chrome, Prematalized (1:1 & 1:2), and Reactive dyes with process details such as time Temperature and pH, Effect of Electrolytes and Use of leveling agents.

UNIT-IV:

1. Description on working of Common machines used in Wet Processing of Textiles -jigger, Hydro-extractor, padding Mangles, Cabinet type Hank dyeing machines, yarn package dyeing machine and Winch.
2. Brief description of the working of Hot Air Stentor and vertical Can Drying Range.

UNIT-V:

1. Natural Dyes- their advantages and disadvantages.
2. Brief idea of methods of Application of natural Dyes (Pre- and Post Mordanting)
3. Brief introduction of Criteria for selection of dyes.
4. Fastness properties (Washing, Rubbing, and Light) of dyed cotton material.
5. Common Defects and damages in Wet processing of Cotton materials.

4.4 PROFESSIONAL ETHICS AND PERSONALITY DEVELOPMENT

UNIT-I :

1. Ethics – Meaning and definition. Different types of ethics.

2. Professional Ethics- Meaning and definition.
3. Employment responsibilities towards organization and its functions.
4. Learning Employer- Employee relationship, Behavioral Pattern, Use of power in Work place.

UNIT-II:

1. Development and growth of self through character traits.
2. Living peacefully and respect for others.
3. Respect for self and work place spirituality.
4. Moral issues, moral dilemmas and moral autonomy.

UNIT-III:

1. Kohlberg's theory of moral development- Carol Gilligan's theory- Consensus consensus and controversy.
2. Theories of right action.
3. Self interest, customs and religion.
4. Code of ethics and its positive roles.
5. A balanced out look on law, relationship between law and ethics.
6. Safety and risk, assessment of safety and risk.

UNIT-IV:

1. Introduction Perception – Its meaning and significance.
2. Principles of perceptual selection – external attention factors, internal set factors, characteristics of perceiver and the perceived attitude.
3. Characteristics of attitude, Changing attitude and behavior.
4. Self assessment and development, personal goal setting and career planning, Self esteem and building of self confidence.

UNIT-V:

1. Components of communication, Principles of communication, Barriers and types of communication based on channels of communication.
2. Listening and observation skills- Body language.
3. Written communication- Planning and Process.
4. Business communication, Essential qualities of business communication.
5. Culture ad work environment, Time management.
6. Study skills and complex problem solving.

4.5 CHEMICAL PROCESSING PRACTICE - II

1. Degumming of given sample of Silk with soap and Mild Alkali.
2. Bleaching of given sample of Silk with H₂O₂.
3. Sourcing of the given sample of Wool by emulsion scouring method.
4. Bleaching of given sample of Wool with H₂O₂.
5. Dyeing of given sample of Wool with Acid dyes.
6. Dyeing of given sample of Wool with 1:1 Metal Complex dyes.
7. Dyeing of given sample of Wool with 1:2 Metal complex dyes.
8. Dyeing of given sample of Silk with Acid dyes.
9. Dyeing of given sample of silk with 1:1 Metal Complex dyes.
10. Dyeing of given sample of silk with 1:2 Metal Complex dyes.
11. Dyeing of Silk with Reactive (Cold Brand) dyes.

12. Dyeing of Cotton with Reactive dyes in compound shades.
13. Dyeing of cotton with Vat dyes in compound shades.
14. Dyeing of Cotton with Direct dyes to Study the effect of Liquor Ratio.
15. Dyeing of Cotton with Direct dyes to study the effect of Electrolytes
16. Dyeing of Cotton with direct dyes to study the effect of Temperature.

4.6 POWER-LOOM WEAVING PRACTICE - II

1. Sketching and familiarization of secondary motion of semi- automatic loom and power-loom- The students shall draw the respective diagram and acquire the basic knowledge about their principle of working.
2. Sketching and familiarization of auxiliary motions of semi- automatic and power-loom – The students shall draw the respective diagram and acquire the basic knowledge about their principle of working.
3. Dismantling and erection of take – up and let-off mechanisms – The students shall dismantle, erect and set the take- up and let- off motions in semi automatic looms / power- looms.
4. Creation of design suitable for saree borders and dhoti borders using dobbies upto 40 levers – The students shall create designs suitable for dobbies.
5. Pegging of lattices – The students shall peg the lattices according to the designs for various kinds of dobbies.
6. Winding and warping – The students shall practice bobbin winding, pirn winding and warping.
7. Weaving – The students shall practice weaving in semi- automatic looms / power-looms.

4.7 TEXTILE TESTING PRACTICE - I

1. Demonstration of equipment available in the Testing Lab and their functions.
2. Notes on Elementary Statistical Tools – Collection of data, Mean, Mode, Median, Standard Deviation, Percentage Mean Deviation, Standard Error and Co- efficient of Variation with their use in Analysis of Test Results.
3. Cross sectional and longitudinal views of different fibres (Demonstration only).
4. Brief notes on Moisture in Textiles and Atmospheric conditions.
5. Determination of Moisture Regain and Moisture Content of the given material by drying and weighing method.
6. Determination of Atmospheric Conditions in the Testing Lab (Relative Humidity and Temperature) – Wet and Dry Bulb Hygrometer.
7. Determination of count – Length and weight method
8. Determination of count Direct reading – Knowles Balance.
9. Determination of count – from fabrics swatch – Beesley's Balance.
10. Determination of count Direct reading – Quadrant Balance.
11. Elementary notes on Twist, its role in Yarn Structure.
12. Determination of Twist per inch in the given sample of yarn using Twist- Untwist Method.
13. Determination of Twist per inch in the given sample of yarn using Straightened Fiber Method.
14. Determination of Crimp in the given fabric swatch.
15. Determination of Weight of given fabric sample in terms of weight / square yard and GSM.

SEMESTER-V

5.1 WEAVING TECHNOLOGY & TEXTILE CALCULATION - IV

UNIT-I:

1. Shuttle less Weaving machines.
2. Rapier weft insertion technique – Single and Double Rapier – Mechanism and working principle.
3. Projectile weft insertion technique – Mechanism and working principle.
4. Air- jet weft insertion technique - Mechanism and working principle.
5. Water – Jet insertion technique - Mechanism and working principle.
6. Introduction to Multi-phase Weaving technique.

UNIT-II:

1. Jacquards – Structure and function of different parts of a jacquard. Working principle of electronic jacquard.
2. Single lift Single Cylinder jacquard - Mechanism and Working principle.
3. Double lift Single cylinder jacquard – Mechanism and Working principle.
4. Double lift Cylinder jacquard – Mechanism and Working principle.
5. Open shed jacquard - Mechanism and Working principle.

UNIT-III:

1. Inverted hook jacquard - Mechanism and Working principle.
2. Cross Border jacquard - Mechanism and Working principle.
3. Self- twilling jacquard - Mechanism and Working principle.
4. Leno jacquard - Mechanism and Working principle.

UNIT-IV:

1. Diameter of yarns.
2. Ashenhurst's formula for estimation of diameter of yarns.
3. Pierce's formula for estimation of diameter of yarns.
4. Relative diameter of yarns.

UNIT-V:

1. Calculation on Cover of Cloth.
2. Warp Cover, weft cover and cloth cover- Derivation and calculation.
3. Fractional Cover, Percentage cover and Cover factor – Calculation for light medium and heavy fabrics.

5.2 FABRIC STRUCTURE AND ANALYSIS - IV

UNIT – I:

1. Leno and gauze fabrics- Salient features.
2. Open, Crossed and Plain sheds in leno weaving.
3. Bottom douping and Top douping – shed formation & comparison.
4. Positive and negative arrangements and Shaker Device.

UNIT-II:

1. Implementation of string doups with Bottom douping and top douping- indication of leno structure, drafting plan lifting plan of fundamental structure.
2. Pointed drafting in leno.
3. Simple effects by using additional back crossing healds.
4. Weaving with more than one leno assembly to create patterns.

UNIT-III:

1. Count of graph paper- Factors influencing the selection of appropriate count of graph paper.
2. Damask – Salient features- Designing and simplified enlargement techniques for fine jacquards, self twilling jacquards, pressure harness and Bannister harness.
3. Figured warp backed cloth – use of sectional harness in simplification of design development process – designing and simplified enlargement technique.
4. Figured weft backed cloth – Separation of two series of weft for simplifying design development process – designing and simplified enlargement technique.

UNIT-IV:

1. Mitcheline quilts and Patent satin – Structure of cloth – use of working comber board for saving of punched cards – Designing and simplified enlargement technique.
2. Figured piques – Structure and styles (2pick, 3pick and 4pick) – Introduction of wadding weft in 3 pick and 4 pick style piques – ordinary pique, Loose back pique and fast back pique – use of working comber board in fast back structures to save punched cards- designing and simplified enlargement technique.

UNIT-V:

1. Analysis of various types of fabrics.
2. Extracting fundamental details like count of warp and weft , ends and picks per unit space; warp and weft crimp and weave repeat.
3. Estimation of weight per square meter, amount of yarn requirement.
4. Estimation of cost of production.

5.3 CHEMICAL PROCESSING OF TEXTILE - III

UNIT-I:

1. Brief description of Structural Parameters of polyester making it difficult to Dye.
2. Need, Principle and Methods of Heat Setting Polyester.
3. Approaches for dyeing, - Various methods of dyeing Polyester involving use of chemical and Thermal energy (Carrier Dyeing and H.T.H.P. Dyeing).
4. Thermo sol method of dyeing polyester.

UNIT-II:

1. Brief description of parts and working of HTHP Beam dyeing machine, Jet Dyeing machine and Soft Flow dyeing machines.
2. Outlines of the common defects and damages while dyeing Polyester on above machines.
3. Process sequences for. Polyester/cotton, Polyester/Viscose.

UNIT-III:

1. Structural aspects of Polyamides (Nylon6 and Nylon66) affecting their dyeing behavior.
2. Dyeing of Polyamides with Disperse, Acid, Metal complex and Reactive dyes; Process details including time, Temperature and pH; Function of chemicals used.
3. Structural aspects of Acrylic affecting their dyeing behavior.
4. Introduction to Method of Dyeing Acrylic with Cationic and Disperse dyes.

UNIT-IV:

1. Introduction to Textile Printing, Differences in Dyeing and Printing.
2. Brief outline of methods of Printing viz. Block Printing, Screen Printing, Rotary and Flat bed Screen

- Printing and Transfer Printing with their merits and demerits.
3. Brief outline of Styles of Printing viz. Direct, Resist and Discharge Printing.

UNIT-V:

1. Photographic Preparation of Printing Screens.
2. Important Printing paste ingredients and their role.
3. Outline of Methods of Fixation commonly used in Printing of Textiles (Steaming, Ageing and Curing).

5.4 PRINCIPLES OF TEXTILE TESTING.

UNIT-I:

1. Importance and objectives of Textile Testing.
2. Sampling techniques- factors governing sampling – Random and biased samples.
3. Elementary Statistics – Measures of Central Tendency and Measures of Dispersion.
4. Atmospheric conditions – Absolute humidity – Relative humidity, Standard testing atmosphere. Measurement of atmospheric condition – Instruments used for determination of relative humidity – Wet and dry bulb hydrometer – Thermo hydrograph – Electrolytic hygrometer.
5. Measurement of Moisture Regain and Moisture content – Moisture testing oven – Shirley Moisture Meter – Corrected invoice weight.
6. Effect of Moisture Regain of fiber properties – Factors affecting Moisture Regain in textile materials – Standard regain value of textile fibers.

UNIT-II:

1. Measurement of linear density (count) – Warp reel and weighing balance method – Direct reading count balances – Knowles balance – Quadrant balance – Beesley's Balance.
2. Study of twist – Definition of twist – Twist direction – Amount of twist – Twist factor and twist multiplier – Twist angle – function of twist in yarn structure – Twist and yarn strength – Effect of twist on fabric properties.
3. Measurement on twist – sampling on yarn for twist testing - : Straightened fibre method, Twist contraction method, Twist-Untwist method for folded yarn – Microprocessor twist tester.
4. Yarn evenness- Study of yarn evenness and its importance on process and product quality- Classification of yarn irregularity – Expression of irregularity – Measurement of yarn evenness by Visual examination, Cutting and weighing Classmate System – Yarn faults.

UNIT-III:

1. Tensile testing of Textile – Introduction – Terminology and definitions.
2. The load and elongation curve – The stress and strain curve.
3. Elastic recovery – Instantaneous and time dependent effects.
4. The mechanics of Strength testing machines – CRL, CRE & CRT.
5. Factors influencing yarn strength – Factors affecting the test results obtained from testing instruments.
6. Pendulum lever principle (CRT) - single yarn strength tester, lea strength tester, Incline plane principle (CRL) and Strain gauge principle – Instron Tester – Ballistic strength tester.
7. CSP and Correct CSP – Merits and demerits of single thread testing and lea strength testing.

UNIT-IV:

1. Fabric strength testing- Introduction, stripe test & garb test and Tearing strength test, Elmendorf tearing strength tester, Bursting testing.
2. Abrasion resistance – serviceability – Types of abrasion – Testing of abrasion resistance – Martindale

- abrasion tester.
3. Pilling of fabrics and its causes – Measurement of picking by using ICI pilling box tester.
 4. Crease resistance and crease recovery – measurement of crease recovery – Shirley crease recovery tester.
 5. Fabric stiffness, handle and drape – Bending length, flexural rigidity, bending modulus – Shirley stiffness tester.
 6. Fabric drape – Drape co-efficient and drape meter.

UNIT-V:

1. Crimp of yarn in fabric – Crimp and fabric properties – Measurement of crimp percentage by using Shirley crimp tester.
2. Fabric shrinkage and its measurement.
3. Inspection of fabrics – American 10 point system – Method of grading – 4 point system for knitted fabrics.
4. Concept of Quality assurance, TQM – ISO and Six Sigma.

5.5 CHEMICAL PROCESSING PRACTICE – iii & CCM

1. Demonstration on scouring and bleaching of Polyester, Nylon and Acrylic.
2. Demonstration on scouring and bleaching of P/C and P/V blends.
3. Dyeing of the given sample of Polyester with Disperse dyes by Carrier method.
4. Dyeing of the given sample of Polyester with Disperse dyes by HTHP method
5. Dyeing of the given sample of P/C or P/V with Disperse and Vat / Reactive dyes (Solid / Cross / Reserve Shades).
6. Dyeing of the given sample of Nylon with Acid dyes.
7. Dyeing of the given sample of Nylon with Metal Complex dyes.
8. Dyeing of the given sample of Nylon with Disperse dyes.
9. Dyeing of the given sample of Nylon with Reactive dyes.
10. Dyeing of the given sample of Acrylic with Cationic dyes.
11. Dyeing of the given sample of Acrylic with Disperse dyes.
12. Brief outlines of Colour Physics.
13. Introduction of CIE system of colour specification (Meaning of L, a, b, a, C, H), Standard illuminants and observer.
14. Calibration of Spectrophotometer.
15. K/S. Data Generation.

5.6 JAQUARD WEAVING & CATD PRACTICE -I

1. Sketching and familiarization of different parts of jacquards – The Students shall draw the respective diagrams and acquire the basic knowledge about their function.
2. Sketching and familiarization of different types of harnessing – The students shall draw the respective diagrams and acquire the basic knowledge about various types of harnessing technique.
3. Sketching and familiarization of piano card cutting machine – The students shall draw the respective diagrams and acquire the basic knowledge about the principle of working.
4. Sketching and familiarization of lay-out of a jacquard loom - The students shall draw the respective diagrams and acquire the basic knowledge about the points to be taken care of while installing a jacquard loom.
5. Preparation of designs for different types of figured fabrics – The students shall draw designs suitable

for various types of figured fabrics like Damask , Figured Warp Backed Cloth, Figured weft backed cloth, Patent Satin, Figured Double Cloth, Figured Piques, etc, - Manual and by using CATD System.

6. Preparation of graph for the designs of various figured fabrics- The students shall prepare the graph and learn enlargement techniques. Manual and by using CATD system.
7. Punching of cards – The students shall punch the pattern cards from the graph by using the Piano Card Cutting machine.
8. Lacing – The students shall lace the punched cards.
9. Harness Building – The Students shall practice harness building for various ties.
10. Weaving – The students shall weave the design from the punched cards they prepared.

5.7 TEXTILE TESTING PRACTICE - II

1. Determination of Washing fastness of dyed material following ISO 1, 2, 3, 4, & 5, standards.
2. Determination of Rubbing fastness of dyed material.
3. Determination of Perspiration fastness of dyed material.
4. Determination of Light fastness of dyed material.
5. Determination of Sublimation fastness of dyed material.
6. Visual assessment of Yarn evenness using ASTM Black Boards.
7. Assessment of Single yarn strength.
8. Assessment of Lea strength of yarn.
9. Determination of Ballistic Strength the given fabric.
10. Determination of Tensile Strength of the given fabric.
11. Determination of Fabric Tearing Strength using Elmendorf Tear Tester.
12. Determination of Crease recovery of the given fabric.
13. Bursting strength testing of the given fabrics.
14. Assessment of Pilling character of fabrics.
15. Determination of bending length of the given fabric using Shirley Stiffness Tester
16. Assessment of Abrasion resistance of fabrics using Martindale Abrasion Tester.
17. Assessment of Drape character of the given fabric.

SEMESTER-VI

6.1 WEAVING TECHNOLOGY & TEXTILE CALCULATIONS- V

UNIT- I:

1. Traditional Design Weaving Techniques of Handlooms – Adai (Warp & Weft) of Kancheepuram, Jala Weaving of Varanasi, Jamdani Weaving of West Bengal, Paithani Weaving of Aurangabad.
2. Warp Tie&Dye Technique – Design Preparation, design transfer to warp, weaving.
3. Warp Tie&Dye Technique – Design Preparation, design transfer to weft, weaving.
4. Combined Warp and weft Tie & Dye Technique – Design preparation, design transfer to warp and weft, Weaving.

UNIT- II:

1. Harness ties – London and Norwich system.
2. Types of Harness ties – Straight, Pointed, Sectional, Boarder and mixed ties.
3. jacquard Design and Harness Calculations- Calculation related to Sett of harness, sett of warp, ends per repeat, size of repeat, number of repeats, symmetrical repeat setting for straight draft and pointed draft, number of cords per hook and casting out.

UNIT- III:

1. Determination of Ends per inch and picks per inch while changing count to maintain the same Level of compactness.
2. Determination of Ends per inch and picks per inch while changing weave to maintain the Same level of Compactness.
3. Determination of Ends per inch and picks per inch while changing count and weave to maintain The same Level of compactness.
4. Determination of Count of warp and weft and Ends per inch and picks per inch while increasing/ Decreasing the weight of fabric to maintain the same level of compactness.

UNIT- IV:

1. Cloth calculations – Amount of warp and weft, weight per linear meter, weight per square Meter using NE, Worsted, Woolen Yorkshire, Denier and Tex system for fabrics with cotton, Silk, worsted, woolen and polyester yarns.

UNIT- V:

1. Costing of fabrics – Handloom-made, Power-loom-made and Mill-made-involving cotton, Polyester, Silk, Wool , etc.

6.2 FABRIC STRUCTURE AND ANALYSIS - V

UNIT-I:

1. Figured double cloth – Structure – use of similar colours in Warp and Weft- Use of different colours in Warp and weft- Design development process for straight harnessing with straight draft – Use of Sectional harnessing and sectional drafting in the manufacture of figured double cloth – Design Development process for sectional harnessing with sectional draft.
2. Figured terry piles – Reversible and non –reversible structures – use of sectional harnessing And inverted hook jacquard – designing and simplified enlargement technique with and Without using Inverted hook jacquard.

UNIT-II:

1. Tapestry – Traditional and modern tapestries.
2. Simple weft faced tapestries; two coloured weft faced reversible structure; three coloured Weft faced and four coloured weft faced Reversible and non reversible structures.
3. Repp stitched tapestries;
4. Combined warp and weft faced tapestries.
5. Designing and simplified enlargement techniques for the above structures.

UNIT-III:

1. Figuring with extra threads – extra warp and extra weft –comparison.
2. Extra Warp figuring technique – continuous, Intermittent and spot styles- anchoring of spot Effect - Planting – Stitching with dedicated weft threads.
3. Extra Weft figuring technique – Continuous, Intermittent and spot styles – anchoring of spot Effects – Chintzing – Stitching with dedicated warp threads.
4. Combined of extra warp and extra weft.

UNIT-IV:

1. Study of Traditional Indian fabrics – Banarasi Brocades and sarees, KancheepuramSaree,

Jamdani- Sarees , ChanderiSarees, PaithaniSarees, PatolaSarees, Pochampalli Tie- Dye Sarees, Kota Doria, Himroo Shawls.

UNIT-V:

1. Analysis of Various types of fabrics.
2. Extracting fundamental details like count of warp and weft, ends and picks per unit space; warp And Weft crimp and weave repeat
3. Estimation of weight per Square meter, amount of yarn requirement.
4. Estimation of cost of production

6.3 CHEMICALS PROCESSING OF TEXTILES - IV

UNIT- I:

1. Process of printing Cotton with Direct Dyes, Reactive dyes in direct style with recipe, process Conditions and role of chemicals used.
2. Process of printing Cotton with Pigments with recipe, process conditions and role of chemicals used.

UNIT-II:

1. Printing of Silk with Acid dyes and Prematalized dyes, respective process details and role of chemicals Used.
2. Printing of polyester with Disperse dyes, respective process details and functions of Auxiliaries used.
3. Brief description of methods for Traditional style of Printing viz. Tie & dye, Kalamkari and Batik Printing.

UNIT-III:

1. Objective of Textile finishing, Factors affecting selection of Finishes, Classification of finishing Process Viz. Mechanical and Chemical finishes, Temporary and Permanent Finishes.
2. Brief outline of Mechanical finishes Process e.g. Calendaring, and Compressive shrinkage process.

UNIT-IV:

1. Description of mercerization – Process details and Effect on Structural characteristics.
2. Brief introduction of Machines used for Yarn and fabric Mercerisation.
3. Brief Outlines of Chemicals finishing process for improvement in serviceability viz. Anti crease finishes, Softening and Stiffening, Flame Retardency, Water Proofing & Water Repellency Finishes.

UNIT-V:

1. Introduction to Bio- Finishing.
2. Outlines of Harmful Chemicals in Wet Processing of Textiles.
3. Introduction to the concept of Eco-friendly Wet processing.
4. Brief description of identification of dyes in powder.

6.4 PRINCIPLES OF MANAGEMENT AND ENTREPRENURSHIP

UNIT-I:

1. Historical of Handloom Industry.
2. Socio Economic importance of Handlooms.
3. Organisational structure structure of Handloom Industry.

4. Primary Handloom Weaver's Cooperative Society, Establishment, objective and functions.

UNIT-II:

1. Government of India's Schemes for upliftment of Handloom Weavers.
2. Functions of WSCs and IIHTs.
3. Cluster Development initiative for Handloom Industry.
4. Scopes of Handloom Exports.
5. Importance of Product diversification and Value addition in Handloom Products.

UNIT-III:

1. Definition of Marketing, Micro and Macro marketing.
2. Modern Approach, Classification of market.
3. Objects and importance of Marketing.
4. Principles of marketing, marketing mix.
5. Marketing Planning, Market information and its importance.

UNIT-IV:

1. Market Research.
2. Types and Objectives of Market research, advantage.
3. Market sampling, Primary and Secondary Data Sources.
4. Definition, Importance and objectives of pricing.
5. Factors affecting price decision, Single Price and Variable Price.
6. Pricing Policy for Handloom Products.

UNIT-V:

1. Significance of Rural Marketing, Urban and International Marketing.
2. Understanding Entrepreneurship, its need and importance.
3. Scope of Entrepreneurial development, Types of Entrepreneurs.
4. Role of Entrepreneurship development, Types of Entrepreneurs.
5. Role of various agencies in promoting Entrepreneurship.
6. Introduction to concepts of E. Business.

6.5 CHEMICAL & PROCESSING PRACTICE – IV & CCM

1. Printing of given sample of cotton in Direct Style with Direct dyes.
2. Printing of given sample of cotton in Direct Style with Reactive dyes.
3. Printing of given sample of cotton with Pigments.
4. Printing of given sample of cotton with Reactive Dyes to produce a suitable design for Dress Material In 3 colour.
5. Printing of given sample of cotton with Reactive Dyes to produce a suitable design for Table cloth in 3 colour.
6. Printing of given sample of cotton with Reactive Dyes to produce a suitable design for Bed sheet in 3 Colour.
7. Printing of given sample of Silk in Direct style with Acid dyes.
8. Printing of given sample of Silk in Direct style with Metal Complex dyes.
9. Printing of given sample of Silk in Discharge style with Acid dyes to produce white discharge Effect.

10. Formulation and Batch correction.
11. Colour maker and Shade Library.
12. Quality assurance.
13. Exercises in Colour Difference.
14. Pass- Fail and Shade sorting.
15. Fastness rating using CCM.

6.6 JAQUARD WEAVING & CATD PRACTICE - II

1. Sketching and familiarization of different parts of jacquard – The students shall draw the Respective Diagrams and acquire the basic knowledge about their functions.
2. Sketching and familiarization of different parts of jacquard – The students shall draw the Respective Diagrams and acquire the basic knowledge about the principle of working.
3. Sketching and familiarization piano card cutting machine – The students shall draw the respective Diagrams and acquire the principle of working.
4. Sketching and familiarization of lay-out of a jacquard loom – The students shall draw the Respective Diagrams and acquire the basic knowledge about the points to be taken care of While installing a Jacquard loom.
5. Preparation of design for different types of figured fabrics – The students shall draw designs Suitable for Various types of figured fabrics like Damask, figured Warp Backed Cloth, Figured Weft Backed Cloth, Patent Satin, Figured Double Cloth, Figured Piques, etc. – Manual and by Using CATD System.
6. Preparation of graph for the designs of various figured fabrics – The students shall prepare the graph and learn enlargement techniques – manual and bus using CATD System.
7. Punching of cards – The students shall punch the pattern cards from the graph by using the Piano Card Cutting Machine.
8. Lacing – The Students shall lace the punched cards.
9. Harness Building – The students shall practice harness building for various ties.
10. Weaving – The students shall weave the design from the punched cards they prepared.

6.7 PROJECT WORK

- i. Every students / group of students shall be assigned a Project Work. He / She/ They shall complete their Project Work in consultation with his/ her/ their Project Guide in a manufacturing establishment / organization or in the Institute itself. The Students may also be deputed for shop floor survey/ study in the Industry during winter vacations if required for the topic allotted to him/ her/ them.
- ii. The synopsis of work shall be evaluated for 20 marks by the Project Guide.
- iii. Evaluation of the Project shall be done for 80 marks by the committee of experts as constituted by the Head of the Institute.