

**SYLLABUS  
DHTT THIRD SEMESTER**

SUBJECT CODE	NAME OF SUBJECTS	No. of Hrs. Per week	marks		
			Internal	External	Total
3.1	Weaving Technology & Textile Calculations -II	4	20	80	100
3.2	Fabric Structure-II	4	20	80	100
3.3	Chemical Processing of Textiles-I	4	20	80	100
3.4	Material Science & Engineering Mechanics	4	20	80	100
3.5	Chemical Processing Practice-I	6	20	80	100
3.6	Weaving Technology Practice-II	6	20	80	100
3.7	Computer Application Practice	3	20	80	100
3.8	Colour Concepts & Textile Designing Practice-I	3	20	80	100
		<b>34</b>	<b>160</b>	<b>640</b>	<b>800</b>

### 3.1.WEAVING TECHNOLOGY & TEXTILE CALCULATION – III

#### Schema:-

1. The subject is divided into five units.
  2. Each unit is given a weightage of 16 marks.
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#### 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 principle.
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 power-loom.
7. Tappet Shedding and Reversing motions-Plain, Twilland Satin.
8. Early Shedding, lateShedding.

#### UNIT – III:

1. Designing of Tappets – Plain, Twill and satin upto 5shafts.
2. Picking Mechanism – Scope of Over- pick andUnder- Pick Mechanism.
3. Cone Over- picks mechanism- Mechanism and workingprinciples.
4. Parallel motion Under- Pick mechanism- Mechanism and working principle.
5. Early picking and Late picking,-.
6. Beating- up Mechanism- Eccentricity ofsley.
7. Timing and Synchronisation of primarymotions.
8. Seven wheel take- up motion.
9. Negative Let-off motion.

#### UNIT IV:

1. Expression of Count of folder 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 andcosting.
5. Average Count of warp – combination of different counts, material and system of counting.
6. Reed Count- Dents per linear 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.

**Reference Book:**

1. Modern preparation and weaving by Aormerod
2. Fabric forming by B Haskukhrai
3. Woven fabric production-1 byNCUTE
4. Weaving Calculation bySengupta
5. Textile Mathematics Vol. 1, 2 and 3 byBooth
6. Warpping Calculation by WIR

### 3.2.FABRIC STRUCTURE – II

#### **Schema**

1. The subject is divided into five units.
  2. Each unit is given a weight – age of 16 marks.
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#### **UNIT – I:**

1. Combination of weaves — Twill and plain, mock leno and plain, Honey comb and plain, tripe and check effect by these combinations — Care about beaming — Design, draft, denting, peg plan
2. Distorted thread effects — Salient feature - warp distortion and weft distortion — Design, draft, denting, peg plan

#### **UNIT – II:**

1. Bedford cord weaves — Salient features - plain faced bed ford cord, (Regular and alternate pick principle) — Design, draft, denting, peg plan and thread interlacing diagram.
2. Twill faced bed ford cord, wadded bed ford cord, and Crepon Bedford cords — Design, draft, denting, peg plan.

#### **UNIT – III:**

1. Welt structures — Salient features and manufacturing techniques - Ordinary wels, Wadded wels – Loose back welt and fast back welt - Design, draft, denting, peg plan and thread interlacing diagram.
2. Pique structure - Salient features and manufacturing techniques - Ordinary Pique, Wadded Pique – Loose back Pique and fast back Pique - Design, draft, denting, peg plan
3. Differences between Bedford cord and welt
4. Difference between welt and piques.

#### **UNIT – IV:**

1. Double cloth-classification on the basis of techniques of achieving unison.
2. Double width plain cloth, Plain Tubular cloth Double Ply cloth - Interlacement diagram and its graphical representation
3. Self stitched double cloth - two methods of stitching - selection of appropriate binding points. Design, draft, peg plan and interlacing Diagram
4. Self itched double cloth using twill, satin, and sateen — Design, draft, peg plan;
5. Center stitched double cloth - Two methods of stitching ( using additional series of warp or weft) using twill, satin, and sateen — Design, draft, peg plan,

#### **UNIT – V:**

1. Thread interchanging double cloth - warp thread interchanging double cloth and weft thread interchanging double cloth - using twill, satin, and sateen — Design, draft, peg plan,
2. 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
3. Wadded Double Cloth - Warp wadding and weft wadding - Design, draft, peg plan, thread interlacement diagram and beaming using plain and twill.

#### **Reference books:**

1. Watson's Textile Design and colour by Z.J. Grosociki.
2. Watson's Advanced Textile Design and Colour by Z,J. Grosociki.
3. Structural Fabric Design by James W. Kilbbe,

4. Fabric Structure by James Golak.
5. Woven cloth construction by R. Mark.
6. Grammar of Textile Design by H. Nisbet.
7. Woven structure and Design by DoriGeomar

### 3.3.CHEMICAL PROCESSING OF TEXTILES – I

#### **Schema**

1. The subject is divided into five units.
  2. Each unit is given a weight – age of 16 marks.
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#### **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. Designing, 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 concept involved in dyeing such as solubility and affinity. Concept of Banned dyes.

#### **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 Fastness Properties.

#### **UNIT- IV:**

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

#### **UNIT- V:**

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

#### **Reference Books:**

1. Technology of Textile processing Vol. II, III & VI by Dr. V A Shenai
2. Scouring and Bleaching by E R Trotman
3. Dyeing and Chemical Technology of Textile Fibres by E R Trotman
4. Chemical Processing of Textiles –by NCUTE

### 3.4.MATERIAL SCIENCE AND ENGINEERING MECHANICS

#### **Schema:-**

1. The activities to be carried out are given in the syllabus
  2. Every student shall be trained in all the listed activities
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#### **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. Lame's theorem, condition of equilibrium and states of equilibrium.
5. Introduction to Dynamics – speed, velocity and acceleration.
6. Equation of linear motion.
7. Motion under gravity and acceleration due to gravity.
8. Newton's three laws of motion.

#### **UNIT- III:**

1. Introduction to strength of materials.
2. Property of elastics, plastics and 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 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 planing 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 – Planing, 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.

**Reference Books:**

1. A textbook of Engineering Mechanics by K S Kulkarni
2. Workshop Technology by Hazara and Chaudhury
3. Workshop Technology by Raghuvanshi



### 3.5.CHEMICAL PROCESSING PRACTICE- I

#### **Schema:-**

1. The activities to be carried out are given in the syllabus
2. Every student shall be trained in all the listed activities

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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 Reactivedyes.
  14. Dyeing of the given sample of cotton with hot brand Reactivedyes.
  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.WEAVING TECHNOLOGY PRACTICE – II

#### **Schema:**

1. The activities to be carried out are given in the syllabus
  2. Every student shall be trained in all the listed activities
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#### **UNIT – I:**

##### **POWERLOOM MECHANISM**

1. Sketching of different parts of primary motions of power-loom and familiarization of their functions.
2. Dismantling, erecting and time setting of shedding mechanism and beat up mechanism.
3. Dismantling, erecting and time setting of over pick and under pick mechanisms..
4. Sketching of different parts of secondary motions of power-loom and familiarization of their functions.
5. Dismantling, erecting and time setting of Seven wheel take-up and let-off mechanisms.
6. Sketching of different parts of Warp protecting, Weft detecting and Drop box motion of power-loom  
And familiarization of their functions.
7. Sketching of different parts of Warp stop, Weft replenishing and positive let-off motions of Automatic power-loom and familiarization of their functions.
8. Creation of designs suitable for saree borders and dhoti borders using Dobbies up to 40 levers.
9. Pegging of lattices as per the mounting of dobbies on power-loom.

#### **UNIT – II:**

##### **FABRIC DEVELOPMENT**

1. Preparing of Design draft, denting plan and tie-up plan of all the weaves dealt in Fabric Structure – II, Fabric Structure – III.
2. Practicing to do drafting in the loom as per the drafting order derived for the above weaves.
3. Practicing to do pegging / tie- up in the loom as per the peg-plan / tie-up plan derived for the above weaves.
4. Finding drafting order in the given loom (up to 8 healds) and creating possible weaves to produce in that draft order.
5. Developing sample without any defects as per the peg-plan / treading order derived for the above weaves.
6. Preparing the album of sample developed and writing their quality particulars.

#### **UNIT – III:**

##### **FABRIC ANALYSIS**

1. General principles of cloth analysis.
2. Extracting warp and weft pattern.
3. Analysis of derivatives of plain, twill and satin fabrics.
4. Extracting fundamental details like count of warp and weft, ends and picks per unit space; warp and weft crimp and weave repeat.
5. Deriving drafting, denting, peg-plan/ tie-up for the weave.

### **3.7.COMPUTER APPLICATION PRACTICE**

#### **Schema:-**

1. The activities to be carried out are given in the syllabus
2. Every student shall be trained in all the listed activities

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1. Introductory notes on Evolution of Computer, Parts of Computer, Fundamental of computers, Hardware viz. Input processing and output devices, Composition of standard KeyBoards.
  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 command and shortcuts used in MS Word.
  6. Practice on Using command and shortcuts used in MS Word.\
  7. Practice on Using Accessories.
  8. Demonstration on command and shortcuts used in MS Excel.
  9. Practice on Using command 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 on commands and shortcuts used in MS Power point.
  13. Practice on Using command and shortcuts used in MS Power point.
  14. Practice on preparation of presentation using Power point.
  15. Demonstration in commands and shortcuts used in MS Access.
  16. Practice on Using command 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 completion certificates etc.

### **3.8.COLOUR CONCEPT AND TEXTILE DESIGNING PRACTICE – I**

#### **Schema:-**

1. The activities to be carried out are given in the syllabus
  2. Every student shall be trained in all the listed activities
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#### **LIST OF ACTIVITIES**

1. Practice on drawing of 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 on Foliage drawing – small plants and flowers – creepers – birds – animals – clouds – still water.
3. Light Theory of Colour.
4. Pigment Theory of Colour.
5. Practice and understanding Light and colour phenomena, colour vision, complementary colours.
6. The chromatic circle, Attributes of colour, Properties of colour – hue – value – intensity.
7. Modification of colour – Hue – Tone –Tint-- Shade – Coloured grays – Colour schemes – Triadic colour factors.
8. 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.
9. Basis of colour harmony – Harmony of analogy – harmony of contrast – Relative spaces occupied by the colours.
10. Positive image, Negative or after image, Colour appeal in Juxta position, colour relation injuxta position.

#### **REFERENCE BOOKS:**

1. Classic Textile Designs by M. Dupontauberville.
2. The Grammar of Ornament by Owen Jones.
3. The History Ornament by Speltz Alexander.
4. The Treasury of Ornament by Dolmetch Herinrich.
5. Decorative art of India by Stronge Susan.
6. English and American Teltiles by MarySchodeser.
7. Free Hand outline and Model Drawing byKancharla.
8. A History of Textiles by Kax Wilson.
9. History of Textile Design by Shenai.
10. The Illustrated History of Textiles by MadeleineGinsbyrg.
11. Tanabana: Handwoven and Handcrafted Textiles of India by Romanie Jaitley and Mallika Sarabhai.
12. Handbook of Textile Design by Jacquie Wilson.
13. A Handbook of Designers by Marypaul Yates.
14. Clothings for Moderns by Erwin Kinchen.
15. Colour and Design in Apparel by Bernice G. Chambers.
16. Fashion Design and Merchandising (Fasion Illustration) byNIFT.
17. Fasion Design and Merchandising (Design Development) byNIFT