

**SYLLABUS**  
**DHTT FOURTH SEMESTER**

SUBJECT CODE	NAME OF SUBJECTS	No. of Hrs. Per week	marks		
			Internal	External	Total
4.1	Weaving Technology & Textile Calculations -III	4	20	80	100
4.2	Fabric Structure-III	4	20	80	100
4.3	Chemical Processing of Textiles-II	4	20	80	100
4.4	Ecology and Pollution Control in Textile Industry	4	20	80	100
4.5	Professional Ethics & Personality Development	3	20	80	100
4.6	Chemical Processing Practice-II	6	20	80	100
4.7	Weaving Technology Practice-III	6	20	80	100
4.8	Colour Concepts & Textile Designing Practice-II	3	20	80	100
	<b>Total</b>	<b>34</b>	<b>160</b>	<b>640</b>	<b>800</b>

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

##### UNIT – II:

Multiple Box Motion – Drop Box – Mechanism and working principle.

1. Automatic Power- looms- Introduction.
2. Mechanism Warp Stop Motion.
3. Weft Replenishment Mechanism – Shuttle Changing & Cop Changing.
4. Brief description about loom width, speed and suitability of power – looms for manufacturing various varieties of cloth.
5. 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.

##### Reference Book:

1. The mechanism of weaving by Thomas W Fox
2. Modern preparation and weaving by A Ormerod
3. Weaving Mechanism Vol. I by N N Banarjee
4. Mechanism of weaving Vol I by J C Chakravarty
5. Fabric forming by B Haskukhrai
6. Woven fabric production-1 by NCUTE
7. Weaving Calculation by Sengupta
8. Textile Mathematics Vol. 1, 2 and 3 by Booth
9. Warpping Calculation by WIRA

## 4.2.FABRIC STRUCTURE – III

### Schema:

1. The subject is divided into Five Units.
  2. Each is given a weightage of 16 marks.
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### UNIT- I:

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

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

### Unit III:

1. Pile fabrics – Salient features
2. Classification of pile fabrics; Loop pile and cut pile; warp pile and weft pile
3. Terry piles – Salient features – Technique of Pile formation.
4. Classification of terry pile structures – 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 IV:

1. Warp pile fabrics produced with the aid of wires: loop plies and piles production techniques - - Design, draft, denting, peg plan, thread interlacement diagram and beaming.
2. Simultaneous insertion of pick and wire and the twin shed formation technique.
3. 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.
4. 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.

### Unit V:

1. Weft piles – Salient features – Manufacturing technique and processes involved
2. Allover velveteen and corduroys – Structure, graphical representation, draft, denting, peg plan and interlacement diagram.
3. Chenille Axminster pile fabrics manufactured using handlooms - technique of fabric manufacture and designing.
4. Difference between various pile fabrics.

**REFERENCE BOOKS:**

1. Walton's Textile Design and Colour by Z. Crosiciki
2. Walton's Advanced Textile Design by Z. Crosiciki
3. Structural Fabric Design by James W. Klibbe
4. Fabric Structure by Golak
5. Woven cloth construction by R. Mark
6. Grammar of Textile Design by H. Nisbet
7. Woven Structure and Design by Dori Goernar

### 4.3.CHEMICAL PROCESSING OF TEXTILES – II

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. 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 Woolens (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 woolens viz. Potting, Crabbing and Decatising.
4. Need of preparatory treatments for important Man Made fibres 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.

#### 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 Dr. C V Kaushik and Mr. Antao IrwinJojico

#### 4.4.ECOLOGY & POLLUTION CONTROL IN TEXTILE INDUSTRY

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. 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, Radioactive / Radiation Pollution
3. Overview of Environmental Pollution in Textile Industry
4. Brief description on Pollutants in Textiles.

##### **UNIT – II:**

1. Air- Pollution – Definition, causes of Air Pollution
- 2 Classification, Sources & Characteristics of Important Air Pollutants
3. Sources of Air Pollution in a Textile Mill
4. Air quality standards, Outdoor air pollution & Indoor air pollution.

##### **UNIT – III:**

1. Water Pollution
- 2 Classification of water pollutants, 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 Textile Dye House waste
- 4 Tolerance level of Effluents in Wet Processing of Textiles
- 5 Impact of water pollution on 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 to Textile Industry.

##### **Reference Books:**

1. Sewage Disposal & Air pollution engineering by S KGarg
2. Environmental pollution and environmental management by Padmanabh Dwivedi
3. A Text book of Environmental studies by Thangamani & Shyamala Thangamani
4. Workshop on Environmental pollution & control in textile industry by BITRA

## 4.5. PROFESSIONAL ETHICS AND PERSONALITY DEVELOPMENT

### 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. Ethics-Meaning and definition. Different types of ethics
2. Professional Ethics-Meaning and definition
3. Employment responsibilities towards organisation and its functions
4. Learning Employer-Employee relationship, Behavioral Pattern, Use of power in WorkPlace.

### 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 outlook 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 behaviour
- 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.

### Reference books:

1. Ethics in engineering by Mike martin and Roland Schinzinger
2. Engineering Ethics by Govindarajan M, Nadarajan S and Senthil Kumar V S
3. Engineering Ethics-Concepts and cases by Charles E Harris, Michael S, Protchard and Michael JRabins
4. Ethics and conduct of business by John R. Boatright
5. Fundamentals of Ethics for Scientist and Engineers by Edmund G Seebauer and Robert I Barry

6. You can win by Shiv Khera
7. Habits of highly effective people by Stephen Convey
8. Perfect Presentation by John Collin
9. Effective Interviews by Jenny Rogers
10. Organizational Behaviour by Keith Davis
11. Personality Development by Afford



#### 4.6.CHEMICAL PROCESSING 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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- 1 Degumming of given sample of Silk with soap and Mild Alkali
- 2 Bleaching of given sample of Silk with H<sub>2</sub>O<sub>2</sub>
- 3 Scouring of the given sample of Wool by emulsion scouring method
- 4 Bleaching of given sample of Wool with H<sub>2</sub>O<sub>2</sub>
- 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

#### 4.7.WEAVING TECHNOLOGY PRACTICE – III

1. Every student shall be trained in all the listed activities.
  2. Every student shall be examined in all the three units during practical examination.The student shall practice the following assignments in batches both in third and fourth semester.
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##### **POWERLOOM MECHANISM**

1. Sketching of different parts of primary motion 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 motion 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 upto 40 levers.
9. Pegging of lattices as per the mounting of dobbies on power-loom.

#### 4.8.COLOUR CONCEPTS AND TEXTILE DESIGNING PRACTICE – III

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. Ornamentation of fabric by using colour stripes and checks.
2. Spotted patterns, Single regular pattern, Single irregular pattern, compound order.
3. Conventionalizing natural object by simplifying.
4. Converting nature form of designs into simple conventional form suitable for printing and weaving technique.
5. Converting natural form of designs into abstract form retaining essential characteristic features.
6. Drawing of elements of Textile Design – motif – unit figure – design repeat.
7. Design setting using Textile Design Bases – Rectangular, Diamond, Ogee and diagonal bases.
8. Distribution of unit figures – Principles of simple drop and reverse drop – Sateen Distribution – All over effects.
9. Creation of layout of a ready to wear textile products – Saree, Dhoti, Lungi, Shwal etc.
10. Layout of home furnishing – Bedspread, Bed sheet, Table cover, Pillow cover, Window curtains, Door curtains, ladies top, baby wears etc.,
11. Preparation of an album containing pictures / samples of Traditional Indian Textiles and their documentation.
12. Preparation of an album containing pictures / samples of Indian brocade fabrics and their documentation.
13. Preparation of an album containing pictures / samples of Indian sarees and their documentation.

##### 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 DolmetchHerinrich.
5. Decorative art of India by Stronge Susan.
6. English and American Textiles by MarySchodeser.
7. Free Hand outline and Model Drawing by Kancharla.
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 (Fashion Illustration) by NIFT.
17. Fashion Design and Merchandising (Design Development) by NIFT