5.1 TECHNOLOGY OF DYEING - III

L	T	P
3	-	4

RATIONALE

A diploma holder in textile processing must have sufficient knowledge and skills about principles of dyeing, operations, materials, equipment and process. He should be able to execute various recipes for dyeing. Hence this subject.

DETAILED CONTENT

1. Modified basic dyes – Principle, Properties and application of basic dyes and modified basic dyes to acrylic. (4 hrs)

2. Introduction to concept of blending and its advantages, types of blends – cots/wool, terry/cot, terry/wool, terry/viscose, acrylic/wool and other commercial varieties and their composition. (8 hrs)

3. Study of dyeing of blends with following dyes (4 hrs)

   - Disperse/vat
   - Disperse/Indigos of dyes.
   - Direct/acid dyes.
   - Disperse/acid dyes.
   - Disperse/metal complex dyes.
   - Disperse/reactive

4. Introduction to natural dyes/eco friendly dyes and their application on different fibres. (8 hrs)

5. Description and working of Beam/, Jet, Soft flow/, Semi continuous and Continuous dyeing machines. (12 hrs)

6. Defects in dyeing of synthetics, its blends and their remedies. (6 hrs)

7. Latest Developments in textile wet processing. (6 hrs)

LIST OF PRACTICALS

1. Dyeing of basic dyes on acrylic (three dyes).
2. Dyeing of modifies basic dyes on acrylic (three dyes)
3. Dyeing of Cot/wool blend.
4. Dyeing of Terry/wool blend (three dyes).
5. Dyeing of Terry/cotton blend (three dyes).
6. Dyeing of Terry/viscose blend (three dyes).
7. Dyeing of Acrylic/wool blend (three dyes).
8. Industrial visit for demonstration of dyeing of blends.

RECOMMENDED BOOKS

1. Technology of Dyeing by V.A Shenai; Sevak Publishers, Mumbai.
2. Dyeing and Chemical Technology of Fibrous Material by E.R Trotman; B.I. Production, New Delhi.
3. A Text Book of Dyes by Arora.
4. Dyeing and Synthetic fabrics by R.S Paryag.
5. Printing and Dyeing of fabrics by James.
6. Dyes and Dyeing by Charlese Pellow; Abhishek Publishers, Chandigarh.

5.2 TECHNOLOGY OF PRINTING-III

L	T	P
3	-	3

RATIONALE

A diploma holder in Textile Processing must have thorough knowledge about principles and practices employed for printing. He must be aware of various operations, materials equipments & Processes used for printing. Hence this subject.

DETAILED CONTENTS

1. Latest Development in Printing Methods (9 hrs)

Automatic, Screen Printing

Buser, & Zimmer Automatic flat bed screen printing machines in respect of working principle, adhesive systems, Squeezer Systems, Printing speeds, fabric movement & other salient features, Advantages & limitations of flat bed screen printing.

Rotary Screen Printing

Introduction to rotary screen printing, working of swivel, magnetic & other squeeze systems used in Rotary Screen printing machine . Advantages of magnetic squeeze systems. Comparison of rotary screen printing & Roller Printing Method.

Marking of Rotary Screen

(i) Emulsion Laquer Screen
(ii) Laser Engraving
(iii) Galrano Screen

Advantages & Limitations of Rotary screen printing

2. Printing of Woolen Materials (5 hrs)

- Preparation of woolen material for printing
- Printing of woolen fabric with acid, metal complex reactive, Basic, Direct & chrome Dyes.
- Printing of cotton/wool blend with Direct & Basic dyes.
- Vigoureoux or Malange Printing of slivers.

3. Printing of Silk Materials (6 hrs)

- Preparation of silk for printing.
- Printing of silk with Acid, Metal complex, direct, Reactive, Basic dyes.
- White & coloured discharge printing of silk
- White & coloured resist printing of silk materials

4. Preparation & printing of Cellulose Acetate/Triacetate (2 hrs)

Preparation & printing of Cellulose Acetate & triacetate Rayon with Disperse Dye stuffs.

5. Preparation & printing of polyamide fibre, fabric & Blends (3 hrs)

Preparation & printing of polyamide fibre fabrics with Acid & Metal complex dyes, Reactive dye & disperse dyes. Printing of cellulose triacetate/polyamide blend with Acid & Metal complex dyes & cationic dyes.

6. Printing of polyester fabrics (3 hrs)

Preparation & printing of polyester fabrics with disperse dye stuffs by direct style & discharge style

7. Preparation & Printing of Polyester/cotton (PC), Polyester/viscous (P/V) Blended fabrics (6hrs)
   - Printing with single class of colour
     - Pigment printing
   - Processes using two classes of colourents
     - Disperse/Reactive
     - Disperse/vat
     - Disperse/Solublised vat

8. Printing of Acrylic fibre and fabrics (6 hrs)
   - Preparation of Acrylic fibre fabric
   - Printing of Acrylic fibre, fabrics with cationic dyes & disperse dyes
   - Printing of Acrylic/cotton, Acrylic/nylon acrylic/polyester & acrylic wool blends with suitable dyes.

9. Printing of Viscous Rayon (4 hrs)

- Preparation & Printing of Viscous Rayon fabrics with direct, reactive, vat, Indigo, Rapidosen, Rapid fast colours by direct style.
- White & coloured discharge Printing on direct dyed ground.

10. Yarn & Carpet Printing (4 hrs)
Brief description of various methods & machine for Yarn & Carpet Printing

PRACTICALS

1. Demonstration of flat bed & Rotary Screen Printing machine in a process house/print house.
2. Printing of polyester fabric with disperse dyes by thermo fixation methods
3. Printing of polyester fabric with pigment colour
4. Printing of silk fabric with direct dyes
5. Printing of woolen fabric with acid dyes
6. Printing of silk with basic dyes
7. Printing of viscous rayon with direct dye
8. Printing of damask effect on viscous rayon fabric
9. Printing of cotton yarn (warp sheet) with reactive dyes by screen or block printing
10. Printing of nylon with disperse/Acid/Reactive dyes.
11. Printing of cotton with indigosol dyes
12. Printing of cotton with vat colours.

REFERENCE BOOKS

1 Technology of Printing by Dr. V.A. Shanai Sewak; Publication, Mumbai

2 Textile Prianting by I.W.C. Miles

3 Textile Printing by Joyce Stoey; Thames & Hudson Ltd., London

4 The creative guide to fabric Screen Printing by Pam and Stall ebras; New Holland Publishers Ltd., London

5 The Principles and Practical of Textile Printing by D.Knecht, E Faturgill J.B.London

6 The Principles and Practicle of Textile Printing by Knecht, E and Fothergill; J.B. London

7 A guide to Printing Techniques by Bast; Japan

5.3 COMPUTER COLOUR MATCHING

L	T	P
-	-	6

RATIONALE

A diploma holder in textile processing must have necessary knowledge & skills regarding colour theory, computer aided colour matching for textiles, colour analysis hardware and software in various colour systems. Hence this subject. The emphasis should be made on development of skills of computer colour matching system through practice.

DETAILED CONTENTS

LIST OF PRACTICALS

1. To study about the fundaments of colour theory & colour mixing laws.

2. To study about concept of metamerism in textiles and matching of shade on colour matching cabinet

3. To study about the CIELAB system of specification of colour

4. To study about the colour matching instruments-spectrophometer and colorimeters used in textile industry.

5. Carrying out following on CCM system.
   - (i) Creation of a data file for a particular class of dye.
   - (ii) Strength analysis of dyes and interpretation of results.
   - (iii) Recipe formulation on different textile material with varying classes of dyes.
   - (iv) Reformulation of recipe
   - (v) Batch correction
   - (vi) Computation of colour difference between two pairs of dyed samples and interpretation of results with reference to grey scales.
   - (vii) Evaluation of shades in different systems within given tolerance limits and results (Pass/fail system)
   - (viii) Shade sorting according to 555 system.

(ix) Assessment of whiteness, yellowness and brightness indices and critical evaluation of results.

REFERENCE BOOKS

1. Computer colour Analysis –Textile applications by A.D. Sule; New age International Publishers, Delhi

2. Instrument Colour measurement & Computer Aided colour mathing for textiels-H.S Shah, R.S.Gandhi; Mahajan Book Distributors- Ahemadabad

3. Understanding Computer Colour Matching; N.S. Ganga Khedkar; Ritu Prakashan, Bombay, India

4. Principle of colour technology by Billmeyer F & Saltzman M.J. Wiley

5. Textile Colour Mixing by Peterson,; Abhishek Publication, Chandigarh

5.4 TEXTILE CHEMICAL TESTING

L	T	P
3	-	5

RATIONALE

A diploma holder in Textile Processing is responsible for controlling the quality of finished product. He is also required to supervise chemical testing of textiles. For this purpose, knowledge and skills about various chemical tests carried out in processing need to be imparted to him. Hence this subject.

DETAILED CONTENTS

1. Introduction to textile chemical testing-aim & scope (2 hrs)

2. Quantitative Analysis of Fibres in a Blended Yarn/Fabric (6 hrs)
   Introduction & method of determination of quantitative analysis of following blends: cots wool, Terry wool, Polyster cotton (PC), Polyster Viscose (PV), Acrylic wool (acru wool), Nylon & wool.

3. Estimation of mechanical & chemical degradation of cotton, wool, & polyester: (8 hrs)

   - Copper Number Test
   - Methylene Blue Test
   - Cuprammonium fluidity test.
   - Barium Activity number

4. Determination of fat and wax content in textile material (2 hrs)

5. Quantitative estimation of bleaching agents-bleaching powder, Sodium hypochloride & hydrogen peroxide. (4 hrs)

6. Colour fastness Tests (18hrs)

   Introduction and importance of colour fastnes tests

   Method of evaluation of colour fastness by grey scales, international standards

Methods of determination of colour fastness to washing, perspiration, hot pressing, sublimation, rubbing, wet scrubbing, light, sea water.

Instruments used in colour fastness testing-laundrometer, perspirometer, crockmeter, exposure rack & light fastness tester .

7. Analysis of fresh water and effluent (4 hrs)

8. Measurement of viscosity of chemical ingredients, and printing paste. (4 hrs)

LIST OF PRACTICALS

1. Identification of blend percentage in following blends:
   - P/C blend
   - P/V Blend
   - P/W/V Blend
2. To evaluate the desizing efficiency
3. To measure scouring loss of a cotton fabric
4. To find the available chlorine in a given sample of sodium hypochlorite
5. To find the strength of H_2O_2 (Hydrogen peroxide)
6. To measure the washing fastness of dyed sample by different international standard test methods and to grade them.
7. To determine the dry rubbing fastness of given dyed sample and to grade them.
8. To determine the wet rubbing fastness of given dyed sample and to grade them.
9. To check the fastness against perspiration of a dyed fabric
10. To determine light fastness of given sample using exposure rack.
11. To find light fastness of a given fabric using light fastness tester.
12. To determine sublimation fastness of the given sample

REFERENCE BOOKS

1. Textile auxiliaries & chemicals by A.A Vaidya-Nitra Publication
2. Textile auxiliaries by Dr. V.A Shenai, Sevak Publication ,Bombay
3. Technology of bleaching by Dr. V.A Shenai, Sevek Publication
4. Quality control in textile wet processing by D.K.Sinha, BIRA paper
5. Chemical Testing of Textile by Hall; Mahajan Publication, Ahemdabad
6. Handbook of Textile Testing and Quality Control by Grover; Mahajan Publication, Ahemdabad.
7. Quality Control of Cloth dimensions and the shrinkage of yarn and fabrics by Shirley Institute

5.5 TECHNOLOGY OF FINISHING - I

L	T	P
3	-	2

RATIONALE

A diploma holder in textile processing must have necessary knowledge and skills regarding principles and procedures used for finishing. For this he should be acquainted with different types of processing machines used for finishing. In addition, relevant skills also need to be developed in him about operation of these machines.

DETAILED CONTENTS

1. Introduction, aims, and importance of textile finishing. (2 hrs)

2. Classification of various types of finishes. (2 hrs)

3. Study of finishes with respect to purpose, fabrics and chemicals used. (2 hrs)
4. Damping – Purpose, Damping machines and their working. (3 hrs)
5. Stiffening (3 hrs)
   - Temporary stiffening
   - Permanent stiffening
   - Soft and stiff finishes on cottons
   - Back filling, description of m/cs used for it

6. Calendaring- Principle, purpose & description of the following calendaring machines. (8 hrs)

   - Chasing & Swiss calendaring
   - Friction calendaring
   - Scheriener calendaring
   - Embossing calendaring
   - Felt calendaring.

7. Principles, Construction and working of drying machines - (6 hrs)
   - Cylinders, their type and parts of cylinder drying.
   - Stenters and hot flue dryers.
   - Comparative study of cylinder and stenter drying

8. Textural Processes: - Purpose, principle and machines used in: (6 hrs)

   - Raising
   - Glazing (sheen & effect)
   - Moireing (water effect)

- Beetling
- Cireing
- Gigging
- Shearing

9. Detailed description on various methods of producing crepe effects. (4 hrs)

10. Shrink proofing of cotton; (4 hrs)
Purpose, Principles and working of sanforising machine:
Zero-zero finish.

11. Semi permanent and permanent finishes: - Purpose, principles and method for following finishes: (8 hrs)

- Wash and wear
- Crease resistance
- Durable press
- Rot and mildew proof finishing**.**

LIST OF PRACTICALS

1. To study the efficiency of softener at varying concentrations on cotton (different varieties).
2. Preparation of starches and its applications at various concentrations on cotton (different varieties).
3. To provide soft and stiff finishes using softeners, starch and polyvinyl alcohol.
4. To draw line diagrams of different finishing machines.

RECOMMENDED BOOKS

1. Textile Finishing by J.T. Marsh- B-I, Publications New Delhi.
2. Technology of finishing by A.J. Hall.
3. Textile finishing to fabric by Bernard P. Corbman Mc Graw Hill Internation Edition.
4. Technology of Finishing by Dr. V.A. Shenai; Sevak Publishers, Mumbai.
5. Textile Finishing by Murphy; Abhishek Publishers, Chandigarh.

5.6 TEXTILE AUXILLIARIES & CHEMICALS

L	T	P
3	-	-

RATIONALE

Diploma holders in Textile Processing are required to do job in Production department, quality control section in the process house. In order to perform these job responsibilities, knowledge about various auxilliaries and chemicals used in different sections (bleaching, dyeing, printing & finishing), their nature, structure and uses are essential. Hence this subject.

DETAILED CONTENTS

1. Introduction (4 hrs)

   - Definition & advantages of textile auxiliaries
   - Selection of Textile auxiliaries
   - Classification of Textile auxiliaries

2. Processing Operations (14 hrs)

   Study of various Textile Auxiliaries used in :

   - Spinning
   - Sizing
   - Desizing
   - Scouring and mercerizing
   - Bleaching
   - Dyeing-Wetting agents, dispersing agents, levelling agents, sequestering agents, Antifoaming agents, carriers, migration inhibitors, dye fixing agents, after washing agents, stripping agents-types and uses.
   - Printing

3. Surface Active Agents (6 hrs)

3.1 Role of surface active agents
3.2 Essential requirement of surfactant
3.3 Classification of surface active agents

- General description with suitable examples on:

  - Anionic surfactants
  - Cationic surfactants
  - Non-ionic surfactants

4. Finishing Chemicals (24 hrs)

Various finishing auxiliaries along with uses:

- Stiffening agents
- Cross linking agents
- Optical Brightness
- Softeners
- Water repellents
- Flame retarding agents
- Anti static agents
- Soil release agents
- Antipilling agents
- Mothproofing, Proofing agents

REFERENCE BOOKS

1. Textile Auxiliaries & Chemicals by A.A. Vaidya; ATIRA Publication
2. Technology of Finishing by Dr. VA Shenai, Sevak Publication
3. Textile Auxiliaries by Dr. VA Shenai, Sevak Publication
4. Textile finishing by J.T Marsh
5. Textile Finishing by Murphy; Abhishek Publication, Chandigarh.