

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI

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|--------------------------|--|---|-------|-------|------------|------------|--|--|--------------------------|------------|-----------------|-------|--------|------------|------------|---|----------|--|---------|-------|-----|----|---|----------|----------------------------|-------|-------|-----|----|---|----------|---------------------------------|------|-------|-----|----|---|----------|-------------------------------------|-------|-------|-----|----|--|--|--|--|--|-----|-----|
| 1 | Name of Syllabus | C C IN WET PROCESSING OF MAN-MADE TEXTILES (402152) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Max. Nos of Student | 25 Students | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Duration | 6 months | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Type | Part Time | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Nos Of Days / Week | 6 Days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Nos Of Hours /Days | 4 Hrs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Space Required | Laboratory 800 Sq.Feet Classroom 200 Sq.Feet Total 1000 Sq.Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Entry Qualification | S.S.C. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Objective Of Syllabus/ introduction | To train and educate the students in processing technology. To provide the industry with skilled manpower. To provide an opportunity for workers to upgrade their qualification so that they get better opportunities for promotions. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Employment Opportunity | After successful completion of this course the workers / students will acquire skills and knowledge required to become operators / supervisors / quality control assistants etc. in the textile industry. After sufficient experience the students can also become officers, managers, can start their own business or work as a consultant in textile industry. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Teacher's Qualification | Diploma in Textile Chemistry/Degree in Textile Chemistry/M.Sc. Chemistry with textile experience | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Training System | <table><tr><td colspan="4">Training System Per Week</td></tr><tr><td>THEORY</td><td>PRACTICAL</td><td colspan="2">TOTAL</td></tr><tr><td>6 hrs.</td><td>18 hrs.</td><td colspan="2">24 hrs.</td></tr></table> | | | | | | | Training System Per Week | | | | THEORY | PRACTICAL | TOTAL | | 6 hrs. | 18 hrs. | 24 hrs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Training System Per Week | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| THEORY | PRACTICAL | TOTAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 hrs. | 18 hrs. | 24 hrs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | Exam. System | <table><tr><td>Sr No</td><td>Paper Code</td><td>Name of Subject</td><td>TH/PR</td><td>Hours</td><td>Max. Marks</td><td>Min. Marks</td></tr><tr><td>1</td><td>40215211</td><td>Introduction to Textiles and Applied Chemistry</td><td>TH-I</td><td>3 hrs</td><td>100</td><td>35</td></tr><tr><td>2</td><td>40215212</td><td>Wet Processing of Textiles</td><td>TH-II</td><td>3 hrs</td><td>100</td><td>35</td></tr><tr><td>3</td><td>40215221</td><td>Dyeing and Printing of Textiles</td><td>PR-I</td><td>3 hrs</td><td>100</td><td>50</td></tr><tr><td>4</td><td>40215222</td><td>Bleaching and Finishing of Textiles</td><td>PR-II</td><td>3 hrs</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>400</td><td>170</td></tr></table> | | | | | | | Sr No | Paper Code | Name of Subject | TH/PR | Hours | Max. Marks | Min. Marks | 1 | 40215211 | Introduction to Textiles and Applied Chemistry | TH-I | 3 hrs | 100 | 35 | 2 | 40215212 | Wet Processing of Textiles | TH-II | 3 hrs | 100 | 35 | 3 | 40215221 | Dyeing and Printing of Textiles | PR-I | 3 hrs | 100 | 50 | 4 | 40215222 | Bleaching and Finishing of Textiles | PR-II | 3 hrs | 100 | 50 | | | | | | 400 | 170 |
| Sr No | Paper Code | Name of Subject | TH/PR | Hours | Max. Marks | Min. Marks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 40215211 | Introduction to Textiles and Applied Chemistry | TH-I | 3 hrs | 100 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 40215212 | Wet Processing of Textiles | TH-II | 3 hrs | 100 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 40215221 | Dyeing and Printing of Textiles | PR-I | 3 hrs | 100 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 40215222 | Bleaching and Finishing of Textiles | PR-II | 3 hrs | 100 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 400 | 170 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

C. C. Course in WET PROCESSING OF MAN-MADE TEXTILES (402152)**Syllabus with Marking Scheme**

| TH - I - Introduction to Textiles and Applied Chemistry (40215211)Marks: 100, Hrs: 66 | | | |
|--|---|--------------|------------|
| Sr No | SEC – I Introduction to Textiles Marks: 40 Hrs: 26 | Marks | Hrs |
| 1 | Basic Fibre Science Important terms related to fibres - Monomer, Polymerization, Polymer, Oligomer, Degree of polymerization (DP), Intra / inter polymeric forces (of attraction), Fibre, Staple fibres, filaments, morphology, moisture regain, moisture content, resilience, crystalline and amorphous region, tensile strength. Classification of textile fibres. General characteristics of fibres for its use as textile fibre (apparels). Comparison of natural and synthetic fibres. | 8 | 6 |
| 2 | Natural fibres: Origin, composition, chemical structure, special features, important physical and chemical properties, advantages and limitations of cotton, linen, wool, silk and jute. Man-Made fibres: Introduction to wet, dry and melt spinning of man-made fibres. Production flow chart, chemical structure, special features, important physical and chemical properties, advantages and limitations of viscose, nylon, polyester, acrylic, and polyurethane fibres. Introduction to texturizing and its advantages. | 8 | 5 |
| 3 | Introduction to yarn manufacture Introduction to cotton spinning - ring spinning and open end spinning. Introduction to woolen and worsted spinning. Yarn twist – s and z twists, effect of twist on yarn properties. Yarn count, denier and tex with simple calculations. Blending of fibers – objectives and methods. Types of yarns and their characteristics as ply yarns, cabled yarns, doubled yarns. | 8 | 5 |
| 4 | Introduction to fabrics Weaving: weaving preparatory processes, loom motions, types of looms – shuttle and shuttle less Basic weaves - plain, twill, satin and sateen. Faults in woven fabric. Knitting - basic structure of knitted fabric, warp knitting, weft knitting, knitted v/s woven fabrics, effect of knit structure on fabric properties. Non-woven: types, introduction to production techniques and their uses. | 8 | 5 |

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| 5 | Physical Testing Reasons for testing, sampling, importance of conditioning of samples before testing. Evaluation of fibre properties as - moisture content & regain, strength, fineness. Evaluation of yarn properties as – strength, evenness, twist per inch. Evaluation of fabric properties as – gsm, tensile strength, bursting strength, resistance to pilling, ends per inch/picks per inch, thread count, dimensional stability, stiffness, crease recovery, air-permeability, cover factor. | 8 | 5 |
| SEC- II Applied Chemistry Marks: 60, Hrs: 40 | | | |
| 6 | Applied Chemistry Atoms and molecules: Atomic Structure, molecular structure, types of bonds. Types of compounds: Organic, aliphatic, aromatic, inorganic. Saturated and unsaturated organic compounds. Type of Reactions: Hydrolysis, neutralization, esterification, saponification, emulsification, oxidation-reduction, endothermic, exothermic reactions, reversible-irreversible reactions, addition and substitution reactions. Examples of each type in textile processing. pH: Definition of pH, pH scale, Importance of pH in processing. Buffers: What are buffers, types of buffers, mechanism of working, their role in processing. Catalysis: What is catalysis, Types of catalysts, role of catalysts in wet processing. | 8 | 5 |
| 7 | Solutions: Difference between solutions, emulsions & dispersions. Concentration of solutions: Normality, Molarity, Molality, % w/w, % w/v, % v/v, g/l. Calculations related to preparation of solutions. Emulsions: What are emulsions, types of emulsions, use of emulsions in processing. Dispersions: What are dispersions, use of dispersions in processing. | 8 | 5 |
| 8 | Inorganic chemicals: Chemical formulae, chemical nature, chemical name, common name, properties and uses of important inorganic chemicals used in textile processing, as - Sodium Carbonate, Sodium Acetate, Sodium Sulphide, Sodium Chloride, Sodium sulphate, Ammonium Chloride, Bleaching powder, Calcium Bicarbonate, Calcium Carbonate, Hydrochloric acid, Hydrogen Peroxide, Nitric Acid, Phosphoric acid, Potassium Dichromate, Sodium Chloride, Sodium Chlorite, Magnesium Chloride, Sodium Hydroxide, Sodium Hydrosulphite, Sodium Metasilicate, Sodium Nitrite, Sodium Hypochlorite, Sodium Sulphite, Sodium Sulphoxylate, Formaldehyde, Stannous Chloride, Sulphuric Acid, Zinc Chloride | 8 | 5 |
| 9 | Aliphatic organic compounds: Structural and short formulae, chemical nature, properties and uses of Aliphatic compounds as Methane, Ethane, Acetylene, Chloroform, Ethyl alcohol, Methyl alcohol, Formic Acid, Acetic Acid, Diethyl Ether, Acetic Anhydride, Formaldehyde, Acetaldehyde, Acetone, Formamide, Acrylamide, Acrylic Acid, Vinyl Alcohol, Vinyl Chloride, Urea, Glycerin, Mono Ethylene Glycol, Amines, Acrylonitrile. | 8 | 5 |

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| 10 | Aromatic organic compounds: Structural and short formulae, chemical nature, properties and uses of Aromatic compounds as Benzene, Naphthalene, Anthracene, Toluene, Phenol, Aniline, Benzyl Alcohol, Benzoic acid, Benzaldehyde, Terephthalic acid. | 8 | 5 |
| 11 | Surfactants: Surfactants, wetting agents, surface tension, angle of contact, mechanism of detergency. Comparison between detergents and soaps. Ionic classification of surfactants. Water: Sources of water, Importance water quality in processing, Water hardness, softening of water, introduction to effluent treatment, norms of effluent contents, BOD, COD. | 8 | 5 |
| 12 | Quality and process control in Textile processing What is quality? Why is quality important? Names and brief introduction of important quality management systems. Process control measures in Desizing, Scouring, Bleaching, Souring, Mercerizing, Dyeing and Printing. Quality control measures in Desizing, Scouring, Bleaching, Souring, Mercerizing, Dyeing, Printing, and Finishing. Inspection of processed fabric, Measurement of fabric absorbency, cuprammonium fluidity, whiteness, ash content, fats and waxes, pH of aqueous extract, Barium activity number, Luster number, deconvolution count, optical brightener test for the uniformity of cross-linking, assessment of degree of heat setting in polyester by iodine absorption method. Recommended norms for desizing efficiency, bleached and mercerized fabric, water-proof/water-repellent fabrics, classification of bleached cotton according to fluidity values, recommended ratings for fastness to important agencies for dyed/printed fabrics, minimum requirements for a fire retardant finished fabric on terms of oxygen index values for important fabrics, general guidelines for various types of resin finished fabrics, minimum performance specifications of wash-n-wear/ DP garments. Assessment of fastness: Grey scales for change in colour, grey scales for staining. Methods of assessment of fastness to washing, rubbing, dry cleaning, perspiration, bleaching, gas fading, ironing, light, sublimation. | 12 | 10 |

| TH - II - Wet Processing of Textiles (40215212) Marks: 100, Hrs: 66 | | | |
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| Sr No | SEC – I Bleaching and Finishing of Textiles Marks: 40, Hrs: 26 | Marks | Hrs |
| 1 | Preparatory Processes for cotton: Objectives, processes, process parameters, machineries for Stitching, sorting, Grey inspection, Brushing, Shearing, Cropping, Singeing. Study of gas singeing operation. Desizing: Objective, acid and enzymatic desizing processes. Their merits and demerits. Measurement of Desizing efficiency. Scouring: Objectives, chemicals used and their functions, method of scouring in machines as kier, J box, HTHP steamers. Scouring of knitted goods & goods with elastomeric fibres, solvent scouring & bio scouring. Mercerization: Process & objectives, effect of mercerization on cotton fibre, types of machines, types of mercerization, mercerization of yarns, | 10 | 6 |

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| | <p>woven & knits, Liquor ammonia mercerization, comparison of both processes.</p> <p>Bleaching & Optical whitening: Bleaching with bleaching powder, sodium hypochlorite, hydrogen peroxide bleaching agents, mechanisms, process details with after treatments, advantages & disadvantages, batch & continuous machines, bleaching of knits.</p> <p>Scouring, Bleaching of Viscose, jute & flax.</p> | | |
| 2 | <p>Preparatory Processes for Silk: Degumming, Effect of degumming on fibre structure, classification of silk on gum removal amount, various degumming processes & machines.</p> <p>Bleaching & Optical whitening of Silk.</p> <p>Preparatory Processes for Wool: 4 methods of fibre scouring, Process details & machine details, backwashing, woolen yarn scouring, woolen fabric scouring, carbonization. Bleaching & Optical whitening.</p> <p>Scouring, Bleaching & Optical whitening of Synthetic fibres& blends.</p> | 8 | 5 |
| 3 | <p>Finishing Objective, requirements from finishing, classification of finishes.</p> | 4 | 3 |
| 4 | <p>Mechanical Finishes : Objectives , terms, machine and process details for heat setting , calendaring , decatizing , raising, sueding, , crabbing , blowing , milling, sanforising, plasma & radiation finishing.</p> | 8 | 6 |
| 5 | <p>Chemical Finishes : Objectives , terms , chemicals , machine and process details for softening , stiffening ,weighting of silk , anti- crease , soil release , flame retardant , anti- pilling , insect resistant &anti- microbial , bio finishing , anti-odour& fragrance finishes.</p> <p>Fashion finishes on garments as stone wash, acid wash, enzyme wash.</p> | 10 | 6 |
| | SEC – II Dyeing & Printing of TextileMarks: 60 Hrs: 40 | | |
| 6 | <p>Dyeing Basics Chemical structure of colour, Principles of dyeing, various dye fibre interactions. Classification of colouring matter based on application. Basic terms in dyeing: % shade, % exhaustion, equilibrium dyeing, saturation dyeing. Basic calculations involved in processing viz. concentrations of chemicals, preparation of solutions of required concentrations, amount of chemicals to be taken on volume basis & on weight of fabric basis.</p> <p>Introduction to computer colour matching.</p> | 8 | 4 |
| 7 | <p>Cellulosic Dyeing: Sub classification, types, methods of application, fastness properties, advantages & disadvantages of Direct, Reactive, Vat, solubilized vat, Sulphur, Azoic dyes.</p> <p>Introduction to Denim processing.</p> | 10 | 6 |
| 8 | <p>Wool & Silk Dyeing : Sub classification, types, methods of application, fastness properties, advantages & disadvantages of Acid, Chrome, Metal complex, Basic, Reactive dyes.</p> <p>Nylon Dyeing : Fibre structure, Types of nylons for dyeing.</p> <p>Sub classification, types, methods of application, fastness properties, advantages & disadvantages of Acid, Basic, Chrome, Metal complex, Disperse, Disperse reactive dyes.</p> | 8 | 5 |
| 9 | <p>Acrylic Dyeing : Fibre structure, acrylic forms for dyeing.</p> <p>Sub classification, types, methods of application, fastness properties, advantages & disadvantages of Cationic, Disperse dyes.</p> | 8 | 5 |

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| | Polyester Dyeing Polyester Dyeing with Disperse dye: Disperse dyeing mechanism , classification of dyes , various methods of application with their advantages & disadvantages. Rapid dyeing, Dyeing of textured, micro, easy & cationic dyeable polyester. Blend Dyeing : Objectives & types of blends, types of blend dyeing, dyeing of polyester/cotton or viscose and polyester/wool blend with one/two bath batch / continuous methods. Dyeing of wool/silk, acrylic/wool, nylon/cotton, cotton/wool blends. | | |
| 10 | Dyeing Machinery: Principles of dyeing machine construction. Machineries for fibre dyeing - Longclose cotton dyeing machine, continuous dyeing of cotton. Machineries for yarn dyeing – hank dyeing, package dyeing. Machineries for fabric dyeing – Jigger, Winch, Jet, Beam dyeing. Machineries for garment dyeing. Padding mangles, continuous dyeing range (CDR). | 6 | 5 |
| 11 | Printing Technology Definition, difference between dyeing & printing, requirements of dye for printing, Styles and methods of printing, print paste composition. Thickeners - classification, preparation, advantages & disadvantages. Printing Machines: Block printing, Roller printing, Preparation of printing screen, Table printing, Flat bed printing, Rotary printing. Machine details, line diagrams, operation details, precautions, merits and demerits. Steamers & Curing ovens - figures, machine details, advantages & disadvantages. Transfer printing - types, mechanism, figures, machine details, advantages & disadvantages. Digital printing - types, mechanism, figures, machine details, advantages & disadvantages. | 8 | 5 |
| 12 | Cellulosic: Pigment, Reactive, Azoics, Vat - in all styles with recipe, process & advantages & disadvantages. Silk, Nylon: Acid & Reactive - in all styles with recipe, process & advantages & disadvantages. Polyester: Disperse - in all styles with recipe, process & advantages & disadvantages. Acrylic: Basic - in all styles with recipe, process & advantages & disadvantages. Polyester/Cellulosic blends: Reactive & Disperse with recipe, process & advantages & disadvantages. | 6 | 5 |
| 13 | Eco-friendly processing: Introduction, toxicity, banned dyes and intermediates, testing method, eco-friendly processing, eco-auditing, eco-labeling, natural dyes. | 6 | 5 |

| PR - I - Dyeing and Printing of Textiles (40215221)Marks: 100 Hrs: 198 | |
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| Sr No | Dyeing |
| 1 | Dyeing of cotton with Direct dyes and after treatment |
| 2 | Effect of salt on the depth of direct dyeing material |
| 3 | Effect of MLR on the depth of direct dyeing |
| 4 | Preparation of a self-shade card for direct dyeing |
| 5 | Dyeing cotton fabric using hot brand reactive dyes by exhaustion method |
| 6 | Dyeing cotton fabric using cold brand reactive dyes by exhaustion method |
| 7 | Dyeing viscose rayon fabric using hot brand reactive dyes by exhaustion method |
| 8 | Dyeing viscose rayon fabric using cold brand reactive dyes by exhaustion method |
| 9 | Dyeing viscose rayon fabric using vinyl sulphone brand reactive dyes by exhaustion method |
| 10 | Continuous / Semi Continuous methods of dyeing Cellulosics with hot and cold brand reactive dyes. |
| 11 | Vat Dyeing of Cellulosics (IW and IN Classes) |
| 12 | Sulphur dyeing of cellulosics |
| 13 | Azoic dyeing of cellulosics |
| 14 | To study the effect of mercerisation on cotton dyeing [Direct , Vat IN class and Reactive Dyes] |
| 15 | Dyeing of wool with leveling , milling & supermilling acid dyes |
| 16 | Dyeing of silk with leveling , milling & supermilling acid dyes |
| 17 | Dyeing of nylon with leveling , milling & supermilling acid dyes |
| 18 | Dyeing of wool with Metal complex dyes |
| 19 | Dyeing of wool with Chrome dyes |
| 20 | Dyeing of acrylic with cationic dyes |
| 21 | To produce self shade card of given polyester fabric with disperse dye using carrier Polyester dyeing at 100°C |
| 22 | To produce self shade card of given polyester fabric with disperse dye at 130°C with carrier and without carrier. |
| 23 | Effect of pH on disperse dyeing of polyester [Alkaline, Neutral & Acidic] |
| 24 | Effect of Temp. on disperse dyeing of polyester [70-90-110 –130°C] |
| 25 | Produce solid shade on PET/Cotton blend fabric using disperse dye for polyester component and direct dye for cotton component |
| 26 | Produce reserve shade on PET/Cotton blend fabric using disperse dye for polyester component |
| 27 | Produce reserve shade on PET/Cotton blend fabric using direct dye for cotton component |
| 28 | Produce contrast shade on PET/Cotton blend fabric using disperse dye for polyester component and direct dye for cotton component |
| 29 | Introduction to Computer colour matching |
| | Printing |
| 30 | Preparation of gum thickeners with starch, sodium alginate, Gum indalca and Meypro gum. |
| 31 | Preparation of an emulsion or half emulsion or synthetic thickner |
| 32 | Printing of Reactive dyes on cellulose by steaming process, baking process and wet-development process. |
| 33 | Pigment printing of cellulosics |
| 34 | Printing of cellulosics with azoic combination using Naphthol printing and Base development process. |
| 35 | To carry out Khadi printing on cellulosics by Emulsion Method |
| 36 | Colour discharge and White discharge printing of direct dyed fabric |
| 37 | Printing of nylon or silk with acid dye |
| 38 | Printing of polyester with disperse dye Printing of P/C blend |
| | Testing |
| 39 | Identification of fibres |
| 40 | Quantitative Blend Analysis of P/C & P/V & P/W fabrics |
| 41 | Washing & Rubbing fastness of direct dyed , direct dyed & after treated & reactive dyed, vat dyed, sulphur dyed fabric samples |

| PR II - Bleaching and Finishing of Textiles (40215222) Marks: 100, Hrs: 198 | |
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| 1 | Bleaching |
| 2 | Acid Desizing of starch sized cotton fabric |
| 3 | Enzyme desizing of starch sized cotton fabric |
| 4 | Bleaching with NaOCl & Optical whitening of the scoured cotton sample |
| 5 | Bleaching with H ₂ O ₂ & Optical whitening of the scoured cotton sample |
| 6 | Bleaching with NaClO ₂ & Optical whitening of the scoured cotton sample |
| 7 | Bleaching of PET/ cotton blended sample with H ₂ O ₂ & optical whitening treatment |
| 8 | Bleaching of PET/ cotton blended sample with NaClO ₂ & optical whitening treatment |
| 9 | Scour, bleach & optical whitening of the cotton fabric by one step process. |
| 10 | Scour, bleach & optical whitening of the PET |
| 11 | Scour, bleach & optical whitening of the viscose rayon |
| 12 | Scour, bleach & optical whitening of the Nylon |
| 13 | Whiteness Index by computer colour matching system |
| | Finishing |
| 14 | Permanent Stiff finishes on Cellulosics |
| 15 | Temporary Stiff finishes on Cellulosics |
| 16 | Soft finishes on cellulosics |
| 17 | Delustering of Viscose rayon by various methods. |
| 18 | Wash & wear finish on the Cotton fabric |
| 19 | Wash & wear finish on the PET / Cotton blended fabric |
| 20 | Temporary Water repellent finish on Cotton using Wax emulsion. |
| 21 | Permanent Water repellent finish on Cotton using polymer dispersions |
| 22 | Temporary Flame retardant finishes on the cotton fabrics |
| 23 | Dimensional stability of cotton fabric |
| | Testing |
| | Estimation of strength of given acid solution in terms of normality & grams / litre |
| 25 | Estimation of strength of given alkali solution in terms of normality & grams / litre |
| 26 | Estimation of strength of given mix alkali solution in terms of normality & grams / litre |
| 27 | Estimation of strength of given bleaching powder solution in terms of available chlorine in grams / litre |
| 28 | Estimation of strength of given sodium hypochlorite solution in terms of available chlorine in grams / litre |
| 29 | Estimation of strength of given hydrogen peroxide solution in terms of % , grams / litre & volume strength |
| 30 | Estimation of strength of given sodium chlorite solution in terms of available chlorine in grams / litre |
| 31 | Strength of given Sodium Hydrosulphite in terms of grams/litre |
| 32 | Strength of given Rongalite-C in terms of grams/litre |
| 33 | Strength of given Sodium sulphide in terms of grams/litre |
| 34 | Strength of given Stannous Chloride in terms of grams/litre |
| 35 | Total alkalinity and total Hardness of Water in parts per million (ppm) of calcium carbonate (CaCO ₃) |

Reference Books

TH-I SEC – I Introduction to Textiles

| | | | |
|----|--|------------------------------|-------------------------------------|
| 1 | Textiles Fibre to Fabric | Bernard P. Corbman | McGRAW-Hill |
| 2 | Textile Fibres | H. V. S. Murthy | The Textile Association (I), Mumbai |
| 3 | Textile Fibres | V. A. Shenai | Sevak Publisher, Mumbai |
| 4 | Chemical Technology of Textile Fibres | E. R. Trotman | Charles Griffin and Co. Ltd. |
| 5 | Textile Science | J.T. Marsh | 131 Publishers |
| 6 | Textile Science | E. P. G. Gohl, L.D. Vilensky | Guilford Publications |
| 7 | A Text book of Fibre science and Technology | Mr. S.P. Mishra | New Age Publishers |
| 8 | Yarn Preparation Vol. I and Vol. II | R. Sen Gupta | Popular Prakashan |
| 9 | Knitting Technology | David Spenser | Peogamon Press |
| 10 | Knitting Technology | D.B. Ajgaonkar | Universal Publisher Corp. |
| 11 | Fabric Structure and Design | N. Gokarneshan | New Age International Publishers |
| 12 | Knitting fundamentals, machines, structures & Developments | N. Anbumani | New Age Publisher Pvt. Ltd. |
| 13 | Motivate series – Textiles | A. Wyne | Macmillan Education Ltd. |

TH - I SEC- IIApplied Chemistry

| Sr No | Book Name | Author | Publication |
|-------|--|--|--------------------------------|
| 1 | Modern Chemistry (Higher Secondary Standard XI) | Singh, Bhambani, Joseph, Dhavale, Zaveri, Rao. | Himalaya Publishing House |
| 2 | Organic Chemistry | P. B. Sarkar & P. L. Rakshit. | Science Book Agency |
| 3 | Inorganic Chemistry for Interscience | Gehani, Parekh and Bhagwat | A. R. Sheth, Mumbai |
| 4 | Chemical Testing of Textiles | Qinguo Fan | Woodhead publishing Ltd. |
| 5 | Comprehensive test methods – textile processing | Indrajit Bhattacharya | Colour publications Pvt. Ltd. |
| 6 | Quality and Process Control | H A Shah, S M Joshi | The Textile Association, India |

TH – II SEC – I Bleaching and Finishing of Textiles

| Sr No | Book Name | Author | Publication |
|--------------|--|--------------------------|---------------------------------|
| 1 | Technology of Bleaching | Dr. V. A. Shenai | Sevak Publication |
| 2 | Chemistry and Technology of fabric preparation and finishing | Charles Tomasino | North Carolina State University |
| 3 | Chemical Finishing of Textiles | W. D. Schindler | Wood Head Publication |
| 4 | Technology of Finishing | Dr. V. A. Shenai | Sevak Publication |
| 5 | Textile Preparation and Dyeing | Asim Kumar Roy Choudhury | Oxford – IBTT, 2006 |
| 6 | Art of Dyeing | B. S. Chauhan | Cheema Boilers Ltd. |
| 7 | Textile Chemical Processing | Jitendra Kumar | Pankaj Pub. Int. New Delhi |

TH – II SEC – II Dyeing & Printing of Textile

| Sr No | Book Name | Author | Publication |
|--------------|--|--------------------------|-------------------------------------|
| 1 | Basic Principles of Textile Coloration | Arthur D Broadbent | The Society of Dyers and Colourists |
| 2 | Textile Preparation and Dyeing | Asim Kumar Roy Choudhury | Oxford – IBTT, 2006 |
| 3 | Textile printing | W. C. Miles | The Society of Dyers and Colourists |
| 4 | Technology of Printing | Dr. V. A. Shenai | Sevak Publication |
| 5 | An Introduction to textile printing | W. Clarke | Butterworths Pvt. Ltd. |
| 6 | Technology of dyeing | Dr. V. A. Shenai | Sevak Publication |
| 7 | Art of dyeing | B. S. Chauhan | Richa Textiles |
| 8 | Dyeing of synthetic polymers and acetate rayon | Nunn | Society of Dyers and Colourists |
| 9 | Dyeing and chemical technology of fibres | E. R. Trotman | Charles Grittin and Co. Ltd. |
| 10 | Dyeing of blends | Cheetham | D Van Nostrand Co. Ltd. |
| 11 | Blends Dyeing | John Shore | Society of Dyers and Colourists |
| 12 | Textile Chemical Processing | Jitendra Kumar | Pankaj Pub. Int. New Delhi |

List of Required Machineries & Equipment

| Sr. No. | ESSENTIALMachineries |
|----------------|---|
| 1. | Lab Padding Mangle |
| 2. | Electronic Weighing Balance |
| 3. | Shaker Dyeing Bath |
| 4. | HTHP dyeing machine |
| 5. | Dryer |
| 6. | Open Water Bath For Dyeing And Pretreatment |
| 7. | Steel Dyeing Pots |
| 8. | Pipettes |
| 9. | Volumetric flask |
| 10. | Measuring flask |
| 11. | Glass Beakers |
| 12. | Erlenmeyer Flask |
| 13. | Glass Test Tubes |
| 14. | Test Tube Stand |
| 15. | Test Tube Holder |
| 16. | Thermometer |
| 17. | Twaddle meter |
| 18. | pH Papers |
| 19. | pH meter |
| 20. | Bunsen Burner |
| 21. | Graduated Cylinder |
| 22. | Burettes |
| 23. | Glass Rods |
| 24. | Steel Rods |
| 25. | Electric Stirrer |
| 26. | Printing Screens |
| 27. | Printing Tables |
| 28. | Squeegee |
| 29. | Launderometer |
| 30. | Crockmeter |
| 31. | Perspirometer |
| 32. | Grey Scales |
| 33. | Baby Steamer |
| 34. | Iron with thermostat |
| 35. | Scissor |
| 36. | Computer colour matching machine |
| 37. | Colour matching cabinet |
| 38. | Hank making machine |

| Sr. No. | DESIRABLE machineries (Students may be taken to Industries having these machineries) |
|----------------|---|
| 1. | Gas Singeing Machine |
| 2. | Desizing Machine |
| 3. | Continuous bleaching range |
| 4. | Continuous Dyeing range |
| 5. | Chain and chainless mercerizer |
| 6. | Jigger Dyeing machine |
| 7. | Fabric stenter Machine |
| 8. | Fabric Calendaring Machine |
| 9. | Winch Machine |
| 10. | Jet dyeing Machine |
| 11. | Package yarn dyeing Machine |
| 12. | Continuous Drying Machine |
| 13. | Decatizing Machine |
| 14. | Sanforizer |
| 15. | Digital fabric printer |

List of Dyes, Chemical and textile material required for practical

| Sr No | Dyes, Chemical, Textile material |
|--------------|--|
| 1 | Textile material – cotton, wool , silk, viscose, polyester, nylon, acrylic in fibre, yarn, and fabric form (woven and knitted), blends – P/C, P/V, P/W |
| 2 | Enzymes for desizing, scouring, garment washing |
| 3 | Surfactants - soaps, detergents, emulsifiers |
| 4 | Bleaching agents– bleaching powder, sodium hypochlorite, hydrogen peroxide, sodium chlorite, optical brighteners |
| 5 | Fibre identification chemicals – nitrobenzene, dimethyl formamide, formic acid, nitric acid |
| 6 | Dyeing and printing - Direct dyes, reactive dyes, vat dyes, sulphur dyes, solubilized vat dyes, basic dyes, naphthols and bases, pigment colours, acid dyes, metal complex dyes, chrome dyes, disperse dyes, |
| 7 | Dyeing auxiliaries - Glauber's salt, common salt, dispersing agents, levelling agents, carriers, retarding agents, dye fixing agents, binders, fixers, wetting agents, |
| 8 | Printing thickeners – mepro gum, gum tragacanth, gum indalka, sodium alginate, starch, synthetic thickeners, kerosene |
| 9 | Printing auxiliaries, anti-foaming agent |
| 10 | Printing chemicals – urea, disodium hydrogen phosphate, diammonium phosphate, |
| 11 | Finishing agents – stiffening agents, softeners, delustering agents, resins, water repellents, flame retardants, |
| 12 | Acids – sulphuric acid, hydrochloric acid, acetic acid, formic acid, oxalic acid, nitric acid |
| 13 | Alkalies – sodium hydroxide, sodium carbonate, sodium bicarbonate, potassium hydroxide |
| 14 | Acid liberating agents – ammonium chloride, ammonium sulphate, magnesium chloride |
| 15 | Oxidising agents – potassium permanganate, sodium chlorate, manganese dioxide |
| 16 | Reducing agents - Sodium hydrosulphite, sodium sulphide, Rongalite-C, Stannous Chloride |
| 17 | Other chemicals - EDTA, potassium iodide, iodine |
| 18 | Indicators – phenolphthalein, methyl orange |