TAMIL NADU PUBLIC SERVICE COMMISSION

SYLLABUS

HANDLOOM TECHNOLOGY / TEXTILE TECHNOLOGY/

TEXTILE MANUFACTURE

(DIPLOMA STANDARD)

CODE: 445

UNIT- I: FIBRE PROPERTIES AND MAN-MADE FIBRE SPINNING

i) Definition of Textile Fibre , Properties required for an ideal Textile Fibre of textile fibres
ii) Classification of Textile fibres – vegetable, animal, mineral, regenerated and synthetic fibre
iii) Microscopic, physical and chemical test methods for fibre identification
iv) Physical, Chemical properties and uses of Vegetable fibres – Cotton, Jute, linen
v) Physical, Chemical properties and uses of Animal fibres – Wool, Silk
vi) Physical, Chemical properties and uses of Regenerated Cellulosic fibres – Viscose Rayon, Uses of HT Rayon
vii) Physical, Chemical properties and uses of Synthetic fibres – Polyester, Nylon 6,6 and Acrylic
viii) Requirements of fibre forming polymers , Spinning of Polymers - Melt Spinning, Wet spinning, Dry spinning
ix) Post Spinning Operations – Drawing, Crimping, Heat setting and Texturisation

UNIT- II: SPUN YARN FORMATION

i) Ginning – Objects and Principles – Types of Ginning machines
ii) Objectives / Principles of opening, cleaning and mixing / blending machines
iii) Blowroom, card – Objects and Principles
iv) Draw frame, comber preparatory, comber, speed frame – Objects and Principles
v) Ring spinning – Object and Principle
vi) Doubling : Ring doubling, Two for One Twister (TFO) – Objects and Principles
vii) Working principles and features of rotor, air jet, air vortex and compact spinning systems
viii) Yarn conditioning, reeling, bundling and baling

UNIT- III : FABRIC FORMATION

i) Objectives of weaving preparatory processes
ii) Winding : Drum, precision and pirn winding - Yarn clearers, tensioners, knotters and splicers
iii) Warping –Types of warping and Creels
iv) Sizing –Ingredients, Size recipes for cotton and its blends with polyester and viscose.
v) Principles of Drawing-in and Denting.
vi) Primary, Secondary and Auxiliary motions of loom, Loom timing diagram.
vii) Tappet, Dobby and Jacquard shedding,
viii) Drop Box and Terry mechanism, Features of semi-automatic loom and automatic loom.
ix) Principles of Shuttle-less Weft insertion systems – Projectile, Rapier, air jet and waterjet looms.
x) Fabric defects – causes and remedies

UNIT- IV: TEXTILE CALCULATIONS

i) Calculations of speed, draft, hank, production and efficiency in spinning machines.
ii) Production and efficiency calculations in Winding, Warping, Sizing and Weaving
iii) Yarn numbering system: Indirect count systems – English, Direct count systems – Tex and Denier.
iv) Conversion of yarn count from one system to other.
v) Resultant count of folded yarn, Average count
vi) Reed, heald and fabric cover calculations
vii) Ex. Mill price calculation of one Kg of yarn and One meter of fabric

UNIT- V: FABRIC STRUCTURE

i) Elements of woven fabric design – Design, draft and peg plan – Colour and weave effect
ii) Construction of Weaves - Plain weave and its derivatives, Twill weave and its derivatives, Sateen and Satin
iii) Crepe, Honey comb, Brighton honey comb, Mock-leno, Huck-a-back, Bedford cords, Welt, pique,
iv) Backed cloth, Double Cloth, Triple Cloth
v) Extra warp and Extra weft figuring
vi) Terry Pile: 3 pick, 4 pick terry weave - Velvets and Velveteens
vii) Gauze and Leno structures

UNIT - VI: CHEMICAL PROCESSING

i) Singeing, Desizing, Scouring, Bleaching and Mercerization – Objectives,
Machines and Methods

ii) Dyes and their Classifications - Direct, Reactive, Vat, Acid, Basic and Disperse dyes.

iii) Dyeing of cotton, silk, wool, polyester and blends

iv) Dyeing machines – Winch, Jigger, HTHP, Soft-flow dyeing machine

v) Styles of printing – Direct, Resist and Discharge.

vi) Printing Methods – Roller, Rotary Screen, Flat bed

vii) Mechanical and chemical finishing – calendering, anti-shrink, resin finish, water repellent finish, flame retardant finish, Anti-microbial and UV protective finish

UNIT - VII: KNITTING, GARMENTS & MODERN DEVELOPMENTS IN HANDLOOMS

i) Knitting - Objects , Comparison between knitting and weaving – Comparison between knitted and woven fabrics

ii) Knitting elements and their functions – Terms and Definitions

iii) Basic weft knitted structures and their properties – Plain, Rib, Interlock and Purl.

iv) Basic warp knitted structures and their properties – Tricot, Lockknit and sharkskin

v) Garments – Grey fabric inspection - Standard Body measurements - Pattern making and grading

vi) Spreading, Cutting, Sewing and Merchandising

vii) Developments in Handlooms – Solid border weaving, multiple putta weaving, Electronic Jacquard for handlooms.

UNIT - VIII: TESTING AND QUALITY CONTROL

i) Definition – Mean, Median, Mode, SD, SE and CV %.

ii) Calculations related to test of significance and control charts.

iii) Sampling techniques – Objectives and types of sampling

iv) Humidity control – Standard Testing atmosphere, Measurement of Relative Humidity.

v) Measurement of fibre length, strength , fineness, maturity and trash

vi) Determination of yarn count – twist per unit length –
Strength: CSP, RKM and Elongation

vii) Evenness, Imperfections and Hairiness

viii) Determination of fabric strength, stiffness, handle, drape, thickness, GSM

ix) Crease resistance, abrasion resistance, pilling resistance, air / water permeability, dimensional stability.

x) Determination of fastness to washing, rubbing, light.

UNIT- IX: NONWOVENS, TECHNICAL TEXTILES AND HANDLOOM FABRICS

i) Classification of Nonwovens - Mechanical, Thermal and Chemical bonded fabrics
ii) Technical Textiles – Medical textiles, sports textiles
iii) Geo textiles, Agro textiles
iv) Automotive textiles and protective textiles
v) Quality Particulars of Handloom fabrics – Sarees, dhotis, bedsheets, towels, lungies
vi) Traditional Handloom Sarees – Banaras, Kanchipuram, Arani and Sungudi

UNIT- X: TEXTILE MILL MANAGEMENT

i) Plant location, Lay out, material handling in textile mills
ii) Production, Planning & Control
iii) Inventory control and its tools : ABC Analysis, Economic Ordering Quantity
iv) Total Quality Management : 5S Concept, ISO 9000, ISO 14000 , SA 8000 Certifications
v) Human Resources Management – Selection, recruitment, training and placement
vi) Factories Act 1948
vii) Role of Bureau of Indian Standards (BIS), Apparel Export Promotion Council (AEPC), Handloom Export Promotion Council (HEPC), Weavers Service Centre (WSC) and Textile Committee
viii) Export Pricing methods – Free On Board (FOB), Cost Insurance Freight (CIF)
ix) Export Procedure - Letter of Credit (LC), Shipping Bill, Bill of Lading (BIL)
x) Pollution Control: Types - Air, Water, Noise; Characteristics of Effluent and Effluent treatment of Wet Processing industry.

Dated: 23.12.2024