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

i) Properties of textile fibres
ii) Classification of Textile fibres – vegetable, animal, mineral, regenerated, synthetic
iii) Microscopic, physical and chemical test methods for fibre identification
iv) Physical & Chemical properties of Vegetable fibres – Cotton, Jute, linen
v) Physical & Chemical properties of Animal fibres – Wool, Silk
vi) Physical & Chemical properties of Regenerated Cellulosic fibres – Viscose and Acetate Rayon, Cuprammonium Rayon
vii) Physical & Chemical properties of Synthetic fibres – Polyester, Nylon
viii) Requirements of fibre forming polymers
ix) Spinning of Polymers - Melt Spinning, Wet spinning, Dryspinning
x) Post Spinning Operations – Drawing, Crimping, Heat setting, Texturisation and spin finish application

UNIT- II: SPUN YARN FORMATION

i) Ginning – Principle, machines and gin out-turn.
ii) Objectives / Principles of opening, cleaning and mixing/blending machines
iii) Working mechanisms of blowroom, card, drawframe, comber, comber preparatory, speedframe, ringframe, doubling machinery.
iv) Salient features of blowroom, card, drawframe, comber, comber preparatory, speedframe, ringframe, doubling machinery.
v) Working principles and features of open end spinning machines – rotor, airjet and airvortex
vi) Norms and Critical settings related to quality / production in spinning machinery.
ix) Yarn conditioning, reeling, bundling and baling
viii) Maintenance of spinning machines

UNIT- III: 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) Indirect count systems – English, French, Worsted, linen and metric
iv) Direct count systems – Tex and Denier.
v) Conversion of yarn count from one system to other - Within Indirect, within Direct systems
vi) Conversion of yarn count from indirect to direct systems and vice versa
vii) Resultant count of folded yarn, Average count, Yarn Costing
viii) Reed and heald calculations; Fabric cover, Fabric Costing.
UNIT - IV: FABRIC FORMATION

i) Objectives of preparatory processes
ii) Preparatory processes for handloom industry
iii) Warp winding - random and precision winding, winding drum parameters
iv) Stop motions, yarn clearers, tensioners and knotters/splicers
v) Warping – Types of warping, Creels, Length measurement, stop motion
vi) Working principles of Pirn winders
vii) Sizing – Ingredients, Size recipes for cotton, silk and blends of cotton with polyester and viscose.
ix) Primary, Secondary and Tertiary motions of loom, Loom timing diagram.
x) Tappet, Dobby and Jacquard shedding, Handloom shedding motion, Drop Box mechanism.
xi) Features of Pit loom, raised pit loom, frame loom, semi-automatic loom and improved handlooms.

UNIT - V: FABRIC STRUCTURE

i) Elements of woven fabric design – weave, draft and peg plan
ii) Construction of Weaves - Plain weave and its derivatives, Regular and Modified Twills, Sateen and Satin, Crepe, Honey comb, Brighton honey comb, Mock-leno, Huck-a-back, Bedford cords, Welt, pique, backed cloth, Double Cloth, Triple Cloth, Tubular cloth, damask, tapestry, patent satin.
iii) Extra warp and Extra weft figuring
iv) Terry Pile – 3 pick, 4 pick, 5 pick and 6 pick terry weaves.
v) Cut Pile – Velvets and Velveteens.
vi) Gauze and Leno structures
vii) Colour and Weave Effect
viii) Computer Aided Textile Designing (CATD) – Photoshop, Coreldraw, Paintshop Pro and CATD softwares

UNIT - VI: CHEMICAL PROCESSING

i) Preparatory processes – Desizing, Scouring and Bleaching – Objectives, Machines and Methods
ii) Mercerisation – Objectives, Machines and Methods
iii) Dyeing techniques for cotton, silk and blends – Direct, Reactive, Vat, Acid, Basic and Disperse dyes.
iv) Batchwise and Continuous dyeing, Dyeing machines.
v) Styles of printing – Direct, Resist, Discharge.
vi) Printing techniques – Roller, Rotary Screen, Flat bed.

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UNIT VII: KNITTING, GARMENTS & MODERN DEVELOPMENTS IN HANDLOOMS

i) Knitting - Yarn quality requirements, principles of weft and warp knitting
ii) Basic weft and warp knitted structures and its properties – plain, rib, interlock and purl.
iii) Garments - Pattern making, Spreading, Cutting, Sewing

UNIT VIII: TESTING & QUALITY CONTROL

i) Important terms in Textile quality control – Mean, Median, Mode, SD, SE and CV.
ii) Calculations related to test of significance.
iii) Control charts and their applications in textile quality control.
iv) Sampling techniques – objectives and types of sampling
vi) Measurement of fibre length, strength, fineness, maturity and trash
vii) Determination of yarn count, twist – Twist per unit length, twist multiplier; strength - CSP, RKM; elongation, hairiness, Evenness
x) Determination of fastness to washing, rubbing, light.
x) Inspection and Merchandising.

UNIT IX: NONWOVENS, TECHNICAL TEXTILES & HANDLOOM FABRICS

i) Classification of Nonwovens - Mechanical, Thermal and Chemical bonded fabrics
ii) Technical Textiles - Belts, Tyre-cords, Coated abrasives, Airbags, Flame Resistant fabrics, Ballistic protective fabrics, Geotextiles, Medical Textiles.
iii) Quality Particulars of handloom fabrics – Sarees, dhotis, angavastrams, bedsheets, towels, lungies, fabrics reserved for exclusive production on handlooms.
iv) Traditional handloom Saris – Banaras, Kanchipuram, Jamdhani, Paithani, Chanderi, Patola, Sungudi, Ikats of Andhra Pradesh and Orissa.

UNIT X: TEXTILE MILL MANAGEMENT

i) Plant location, lay out, material handling in textile mills
ii) Selection and balancing of preparatory machines and looms
iii) Costing – Elements, Balance sheet, Profit & Loss Account
iv) Production, Planning & Control.
v) Total Quality Management, Management Information System.
vi) Human Resources management – Selection, recruitment, training, Industrial relations and Labour laws
vii) Role of BIS, AEPC, HEPC, IIHT, WSC, Textile Committee, Textile Commissioner Office.
viii) New Textile Policy.
ix) Pollution Control: Types - Air, Water, Noise; Characteristics of Effluent and Effluent treatment of Wet Processing industry
x) Energy audit and conservation

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