DEPARTMENT OF TEXTILE SCIENCE AND APPAREL DESIGN. PET SYLLABUS

Topic and Details
Fibre Science: • Polymers and their essential requirements to be fibres for apparel; Filament extrusion techniques in relation to fibre properties. • Natural fibres such as cotton, viscose, wool and silk; Important features of their physical and chemical structure; Properties in relation to fabric/garment performance • Synthetic fibres such as polyester, nylon, acrylic and polypropylene; Important features of their physical and chemical structure; Properties in relation to fabric/garment performance
Pre-treatment of textiles A. Importance of pre-treatments B. Cotton: desizing, scouring, bleaching, Mercerization C. Wool: scouring, bleaching D. Silk: degumming, bleaching **E.** Synthetics: scouring, heat setting
Colouration of Textiles • Colour perception, Hue, Chroma, Saturation; Dyes and pigments; Application wise classification of dyes; • Principles of dyeing and application of dyes Direct, Reactive, Vat on cotton,Disperse on polyester, Acid on wool and nylon,Basic on acrylic, silk, Natural dyes. • Performance of dyed textiles; Fastness requirements for different end usesPrinting of textiles: • Principles of printing, Printing using dyes and pigments on different fibre fabrics; fixation of prints using various methods; Techniques of printing. After treatments like fixation by steaming/curing, soaping, washing etc.
Finishing of textiles: Classification of finishes; Mechanical and assisted finishes and machines used for; Specialty Finishes like wrinkle free, durable press, flame retardant, water proof, soil & stain release, antibacterial.
Classification of auxiliary chemicals used in textile processing; Properties of wetting agents, softeners, detergents, levelling agents, carriers, bleaching agents, thickeners, binders; Eco-friendly chemicals
Introduction to equipment and machineries used in **Processing**, such as kier/ J-box, winch, jigger, padding mangle, steamer, curing chamber, washing unit,
Environmental aspects of textile processing (in brief): Energy and water conservation; Pollution caused by textile processing and permissible limits of pollutants in water; Hazardous chemicals and their substitution.
Smart Textiles

• Importance of Textile Testing and analysis • objectives (reasons) of textile testing, Uses of Testing information, Factors influencing Quality Control • Sampling, terms used in sampling, fiber sampling,, yarn sampling, fabric sampling • Development of standard test methods, national and international organizations involved in textile testing, ISO Stds. and ISO – Series Precision and accuracy of testing methods, atmospheric conditions for textile testing, temperature and humidity, measurement of humidity and moisture in textiles
Fiber Dimensions Fiber Fineness, Methods of measuring fiber fineness Fiber length, methods of measuring fiber length Fiber strength – Single fiber method, Bundle strength method
Yarn Test • Linear Density – Direct & Indirect system, folded yarns, methods of measuring linear density of yarns from packages and skeins and from a fabric sample • Yarn Crimp • Yarn Twist – Level of twist and twist factor methods of measuring twist, yarn evenness and methods of assessing evenness • Yarn strength – Single strand method skein method, count strength product (CSP)

Strength properties of Textile & Apparel –
Terminologies and definitions like force units, Breaking strength and Tensile strength, Stress, specific stress, Tenacity, Elongation, Strain, Extension, Extension percentage, Gauge length, Elastic recovery, Force and elongation curve
Factors affecting tensile testing, fabric characteristics
affecting tensile properties, tensile testing machines and their working principles
Fabric Test Methods –
    • Breaking strength, Tearing Strength, Bursting strength
    • Fabric Stiffness, Handle and Drape
    • Fabric Assurance by Simple Testing (FAST) system.
    • Pilling, Abrasion
    • Fabric / Garment Serviceability
    • Wear Comfort of Clothing
    • Water Absorption of Fabrics
    • Water Repellency of Fabrics
    • Dimensional Stability

Colour Fastness Introduction, colour fastness test methods to washing, dry cleaning, light, crocking, perspiration, heat (hot pressing)
Grading and Methods of grading patterns Application of IT in the field of pattern making & grading

History of Fashion from 18th Century till date France, Italy, England, America, Japan, India
Importance of textiles in historical perspective India, China, Egypt, Persia, Crete, Greek, Rome, Peru
Indian Traditional Costumes:
-   Maharashtra, Rajasthan, Gujarat, Andhra Pradesh, Uttar Pradesh, Madhya Pradesh, Kanataka, Kerala, Tamil Nadu, Meghalaya, Assam

Costume in ancient civilization: Indian, Egyptian, Greek, Roman
Couture from 18th century till date: France, Italy, England, American, Japanese, Indian
Changes happened in clothing style from 3000 BC till 21st century:
 Modern Age   - Renaissance Fashion, Spanish Fashion, Netherland Fashion
                        - Rhineland Fashion, Rococo Fashion, English Fashion
Present Day : 20th century, The Twenties, The Thirties, The Forties, The Fifties
                        The Sixties, The seventies, The Eighties, The Nineties, 21st century

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- The Research Process
- Steps in Research Process and Elements of Research
- Types of Research
- Sampling
- Tools for Data Collection

- Cloth Calculations
- Elements of cloth structure – Weave and weave notation,
- Elementary Weaves
- Other weaves – Diamonds and Diapers, Crepe, Honeycomb, Huckaback, Mockleno, moss crepe, Honeycomb, Brighton Honeycomb/Bedford cord, Welts and Pique
- Extra weft and extra war figuring effects
- Lappet and swivel figured fabrics
- Warp, weft pile fabric and terry & Turkish towels
- Gauze and net leno
- Damask Double cloth Triaxial weave
- Simple colour and weave effects
- Compound colour and weave effect

- Introduction to Statistics
- Normal Distribution and its Properties
- Data Management
- Data Analysis
- Chi square test and its interpretation
- Correlation and Regression and its interpretation
- Analysis of Variance and its interpretation
- Design of Experiments
- Presentation of Data
- The Research Report
- Preparation of a Research Proposal

- Introduction to knitting
- Differences between knits and woven.
- Basic mechanical principles of knitting technology, elements of knitted loop structure, four primary base structures (plain, rib, interlock, purl)
- Weft knitting and warp knitting
- Knitted structures, structured knits, jacquard knitting, intarsia knitting – basic principle and stitches and their application
- The structure of a flat knitting machine: Needle bed assembly, the carriage, Yarn feeding, Needle brushes, Fabric takedown.
- Manual operation of a flat knitting machine and circular knitting machine
- Electronics in knitting.
- Fashion knit garments

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- The Organizational Structure of a Garment Factory
- Alternative method of joining materials
- Quality Control
    - Principles of Quality Control
    - Quality from Design to dispatch
    - Total Quality Control

Technical Textiles
Introduction Definition & Scope, Development
Processes, Applications, Globalizations, Future prospects of technical textile industry
Brief introduction to Technical fibers
- **Conventional and New developed fibers and their applications**
Brief introduction to Technical yarns
Technical Fabric Structures
    a) Brief study of woven and knitted fabrics b) Detailed study of Non woven structure
Introduction, methods of batt production, different methods of web laying, flash spinning, melt blown, different methods of bonding, Hydro entanglement process
Brief introduction to Textile Reinforced – Composite
material
Finishing of Technical Textiles
 - Introduction, Processes, Mechanical, Heat setting and Chemical process
Coating of Technical textiles
 - Introduction, methods of coating, fusible interlining and laminating
Application of Technical Textiles - Medical textiles, Geo textiles, Defence textiles, Transport textiles, Automotive textiles and others