

**Course Objectives:**

- To make the students acquainted with the operational principle of equipments used for testing of various parameters of yarn and fabric.
- To enable the students to learn about the testing method of various characteristics of yarn and fabric.

**Course Outcomes :**

Upon completion of the course the student will be able to :

- Describe the principle of measurement of different parameters and characteristics of yarn and fabric.
- Operate equipment used for testing various properties of yarns and fabrics applying knowledge gained through this course.
- Analyze the various reports generated during quality evaluation of yarn and fabric.
- Interpret the results and drawing interferences.

**Module-I**

**Testing of Yarn Count, Twist and Strength :** Yarn numbering and conversion system, twist in continuous filament, spun and plied yarns - twist direction – twist factor – twist and yarn strength; twist measurement and breaking twist angle measurement. Tensile properties of yarn- various type of measuring instruments based on CRT, CRL and CRE and their working principles for measuring tensile strength of yarn- -Single yarn strength; Lea count strength product (CSP) and Corrected Count Strength Product (CCSP), factors affecting tensile properties, elastic recovery, effect of impact loading and fatigue behavior.

**Module-II**

**Testing of Yarn Evenness and Surface Quality:** Nature and causes of irregularities, principles and methods of evenness testing, evaluations and interpretation of evenness results, concept of index of irregularity. Analysis of periodic variations in mass per unit length. Variance - length curves and spectrogram analysis, yarn faults classification, Uster Classimat and Classifault.

Yarn Appearance; Yarn abrasion resistance – importance and measuring technique.

Yarn hairiness – importance and assessment techniques.

Yarn friction – static and dynamic friction – methods of measurement

**Module-III**

**Testing of fabric construction particulars :** Measurement of ends and picks per inch, count of warp and weft, determination of the type of weave, measurement of length, width, thickness and Area density (GSM); warp and weft crimp measurements for spun and filament yarn fabrics, the cover factor calculations.

**Testing of Fabric Appearance, Dimensional and Surface Characteristics:** Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drape coefficient ; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability testers, water repellency, contact angle; Fabric dimensional stability and fabric shrinkage testing; Fabric abrasion resistance – measuring technique; Fabric pilling resistance – methods of determination.

### Module-IV

**Testing of Fabric Strength :** Tensile strength measurement – ravelled strip test and grab test – mechanical and electronic measuring systems. Tear strength – importance – measuring systems. Bursting strength and its measurement. Ballistic impact strength. Universal tensile tester - principle and operation.

**Fabric inspection :** Manual, semi-automatic and Automatic Inspection systems, classification of fabric defects, independent product quality certification, acceptable quality level, MIL standards and final inspection. Quality assessment of garments - cutting, sewing, pressing, finishing and packaging defects.

### Books Recommended:

1. Booth J. E., –Principles of Textile Testing|| Butterworths, 1996.
2. V.K.Kothari, –Testing and Quality Management|| IAFL Publications, 1999.
3. GAV Leaf., –Practical Statistics For The Textile Industry: Part I||, The Textile Institute, 1984.
4. Saville B.P., –Physical Testing of Textiles||, Woodhead publishing -UK, 2004.
5. Jinlian H U, –Fabric Testing||, Woodhead Publishing, 2008.
6. Arindam Basu., –Textile Testing (Fibre, Yarn and Fabric)||, SITRA, Coimbatore, 2001.
7. Somasundar S., –Application of Statistical Methods in Textile Industry||, SITRA, Coimbatore, 1998.

## TESTING OF TEXTILE MATERIALS LABORATORY

### Yarn Testing

1. To determine the Hank and Hank C.V% of the given sliver / Determination of the within bobbin and between bobbin hank C.V % of the given roving.
2. To determine the count of a yarn by using physical/electronic balance.
3. To measure the Single yarn and Ply yarn twist of the given yarn sample using Twist Tester.
4. To determine the Yarn count, Lea Strength and CSP of the given yarn sample
5. To determine the single yarn strength.
6. To Study evenness and imperfection in the given yarn and compare the results with Uster statistics.
7. To Study the spectrogram and irregularity trace to determine type of irregularity present. Study the imperfections at different sensitivity level for different yarn samples.
8. To Prepare yarns Appearance Boards and compare with ASTM standards.

### Fabric Testing

1. To characterize a woven fabric with respect to its dimensional properties: Thread density, yarn number, yarn crimp, weave, cover factor, weight(GSM), areal density, skewness, thickness
2. To determine the tensile strength of a woven fabric by strip test method. Draw load-elongation curve of a woven fabric.
3. To determine the tear strength of a fabric using Elmendorf tear tester or ballistic tester.
4. To determine the bursting strength of a fabric using hydraulic bursting tester.
5. To determine the abrasion resistance of a fabric.
6. To determine the bending length and flexural rigidity of a woven fabric using the Shirley tester.
7. To determine the crease recovery of fabric and observe the effect of loading time and recovery time on crease recovery.
8. To determine the drape coefficient of woven and knitted fabric using the drape meter.
9. To measure the Air permeability and Fabric Impact Strength of the given fabric.
10. To measure the water permeability of the given fabric.