Program : **Diploma in Textile Technology**	
Course Code : **5061**	Course Title: **Textile Testing**
Semester : **5**	Credits: **4**
Course Category: **Program core**	
Periods per week: **4 (L:3, T:1, P:0)**	Periods per semester: **60**

Course Objectives:

- To impart the knowledge of statistical techniques and humidity in textile testing and to get exposed to different testing instruments,
- To understand the principles and methods for testing of fibres, yarn and fabrics.

Course Prerequisites:

Topic	Course code	Course Title	Semester
Yarn Count Calculation		Fabric Formation - 1	3
Natural fibres		Textile wet Processing I	3

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Discuss the Statistical Techniques in textile testing and influence of moisture and Humidity on textile materials.	15	Applying
CO2	Explain the procedure for testing Fiber length, strength, fineness, maturity and trash content in cotton.	15	Understanding
CO3	Recognize the Yarn testing methods for determining count, strength, twist, evenness and hairiness of yarn.	14	Understanding
CO4	Discuss the Fabric testing methods for determining various fabric properties.	14	Understanding
	Series Test	2	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2					
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Discuss the Statistical Techniques in textile testing and influence of moisture and Humidity on textile materials.**		
M1.01	Understand the objectives of Textile Testing	2	Remembering
M1.02	Understand the elements of statistics and its application in textile testing.	6	Applying
M1.03	Understand the influence of moisture and Humidity on textile materials.	3	Understanding
M1.04	Understand the measurement of Humidity, Moisture content and regain	4	Understanding
Contents: Objectives of Textile Testing - Define statistics - Selection of Sample for testing - population and sample in statistics - frequency distribution - Graphical representation of frequency distribution - Histogram, frequency polygon and frequency curve - Measures of central Tendency - mean, median and mode - Measures of Dispersion - Range, standard deviation, CV%, Variance . Estimation of Measures of central Tendency & Dispersion. Humidity - importance of humidity in textile testing - expressions of humidity - Absolute humidity and Relative humidity - Measurement of Humidity of the atmosphere by wet and dry bulb and sling hygrometer - standard testing atmosphere - Estimation of Moisture content and regain of textile materials by conditioning oven and electronic moisture meter - Standard moisture regain of important textile fibers - Estimation of standard regain of blends P/C, P/W, P/V - Effect of moisture regain on fibre properties.			
CO2	**Explain the procedure for testing Fiber length, strength, fineness, maturity and trash content in cotton.**		
M2.01	Understand the importance of fibre length, fineness and its determination methods	4	Understanding
M2.02	Understand the importance and estimation of fibre strength and maturity.	4	Understanding

M2.03	Understand the method of estimation of trash content in cotton by Shirley trash analyzer.	4	Understanding
M2.04	Understand advanced fibre testing systems	2	Understanding
	Series Test - I	1	

Contents:

List the important properties of fibre - Importance of fiber length - Estimation of fiber length parameters using Baer sorter - Span length, 2.5% and 50% span length, uniformity ratio - Estimation of fiber length using Digital fibro graph. Importance of fiber fineness - Airflow principle - Determination of fiber fineness by ATIRA fiber fineness tester. Importance of fiber strength - Strength terminologies-Load, Breaking load, Stress, Mass stress, Tenacity, Strain, Young's modulus, Elongation, Breaking extension - Estimation of bundle fiber strength by Stelometer (CRL Principle).

Importance of fiber maturity - List the different methods of determination of fiber maturity - Estimation of fiber maturity by Caustic soda swelling method.

Cleaning efficiency - Lint - Trash - invisible loss - Estimation of trash content in cotton by Shirley trash analyzer. Features and working of Advanced Fiber Information System [AFIS] and High Volume Instrument [HVI].

CO3	**Recognize the Yarn testing methods for determining count, strength, twist, evenness and hairiness of yarn.**		
M3.01	Understand the methods of determining Yarn count and strength	5	Understanding
M3.02	Understand the procedure for yarn twist determination	4	Understanding
M3.03	Know the concept of yarn evenness and its method of determination	4	Understanding
M3.04	Understand the concept of testing yarn hairiness.	3	Understanding

Contents:

Yarn count - Determination of yarn count by Beesley 's balance-Importance of yarn strength - factors affecting yarn strength - Estimation of single yarn strength by Uster Tensorapid (CRE Principle) - CSP - Working of lea strength tester (CRT Principle)

Importance of Yarn twist - Definition of twist, S twist, Z twist, twist on twist, weft on twist - Different methods of twist determination - Estimation of twist in yarn by tension type twist tester and take-up twist tester.

Importance of evenness of the yarn - terms associated with evenness - random variation, periodic variation - Method of determination of yarn evenness - working principle of Uster evenness tester (UT5) - Parameters for expressing unevenness - U%, CV% and Imperfections. Classification of basic classimat faults - Yarn hairiness - Determination of yarn hairiness by Zweigle G 565 Hairiness tester - Comparison between Zweigle S3 value and UT3 hairiness index value.

CO4	**Discuss the Fabric testing methods for determining various fabric properties.**		
M4.01	Understand the different fabric properties and characteristics	3	Remembering
M4.02	Understand the methods of determining Fabric dimension, threads density, fabric weight, cover factor and crimp.	4	Understanding
M4.03	Understand the methods of determining Fabric strength, abrasion resistance and stiffness.	4	Understanding
M4.04	Understand the methods of determining drape co-efficient, crease property and air permeability of fabric	3	Understanding
	Series Test - II	1	

Contents:

Fabric properties and characteristics - Dimensional properties of Fabric – fabric thickness - Threads density - Fabric weight - Count of the yarn used for fabric manufacture - Determination of cover factor - Warp cover factor, Weft cover factor and Cloth cover factor - Crimp in yarn - Crimp percentage and crimp amplitude - Shirley yarn crimp tester - Define pill and causes of pill formation - Fabric strength - Determination of Fabric tensile strength by CRT principle - Elmendorf Tearing strength tester - Hydraulic bursting strength tester -

Fabric abrasion resistance - Types of abrasions - Martindale abrasion tester - Fabric stiffness - Bending length, flexural rigidity and bending modulus - Cantilever principle - Shirley stiffness tester - Drape and drape co-efficient -Determination of drape by Drape meter - Crease resistance and Crease recovery - Shirley crease recovery tester -

Define air and water permeability - air permeability, air resistance and air porosity - Shirley air permeability tester

Text / Reference:

T/R	Book Title/Author
T1	J.E. BOOTH - Principles of Textile Testing- Butterworth third edition
R2	Arindam Basu - Textile Testing Fiber, Yarn & Fabric, SITRA Publication 2019
R3	Butterworth & Grover - Hand book of Quality control and Textile testing
R4	ISO - Hand book of textile testing
R5	J.E. BOOTH - Principles of Textile Testing- Butterworth third edition

Online resources:

Sl.No	Website Link
1	www.textilelearner.blogspot.com
2	http://mytextilenotes.blogspot.in
3	http://nptel.ac.in/
4	https://www.astm.org/Standards/textile-standards.html