

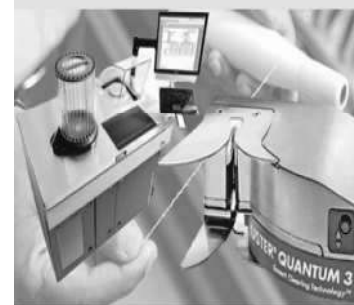
# 19TT211 TESTING OF FIBERS AND YARNS

Hours Per Week :

| L | T | P | C |
|---|---|---|---|
| 3 | - | 2 | 4 |

Total Hours :

| L  | T | P  | WA/RA | SSH/HSH | CS | SA | S | BS |
|----|---|----|-------|---------|----|----|---|----|
| 45 | - | 30 | 10    | 45      | -  | -  | - | -  |



**SOURCE:**

<https://www.textilegence.com/en/uster-systematic-quality-management-is-a-priority>

**PREREQUISITE COURSES :** Yarn Manufacturing

## COURSE DESCRIPTION AND OBJECTIVES:

This course offers testing procedures for measurement of essential fiber properties, measurement principle and techniques for yarn dimensions and essential yarn properties. The objective of this course is to impart skill required for testing of fibers and yarns.

## COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

| COs | Course Outcomes  | POs |
|-----|--|-----|
| 1   | Decide the parameters to be considered in selection of fibers and yarn samples.                                    | 1   |
| 2   | Explain the principles of testing for the measurement of fibre and yarn properties.                                | 1   |
| 3   | Analyze test results of fibers and yarns by using statistical tool.  | 2   |
| 4   | Distinguish the working principle of advance instrument like AFIS, HVI.  | 5   |
| 5   | Develop the solutions for the complex problems in the process through the thorough investigation into the problem. | 3   |

## SKILLS:

- ✓ Determine sample size base on deviation and sample error
- ✓ Apply significance test viz. Z test and ANOVA
- ✓ Measure fibre length, strength, fineness and maturity
- ✓ Measure yarn count strength, twist
- ✓ Analyze and correlate the testing report of AFIS, HVI, spectrograph and USTER tester.

**UNIT - I** **L-9**

**INTRODUCTION TO TEXTILE TESTING AND QUALITY CONTROL** : Objectives of testing, determination of sample size for testing & selection of samples for testing, sampling errors, point estimations of mean and variance, interval estimation of mean and variance, number of tests; Significance test: t-test, z-test and ANOVA with application to textile; Random and biased sample, length and extent biased samples, zoning technique for raw cotton.

**UNIT - II** **L-9**

**MEASUREMENT OF REGAIN AND MOISTURE CONTENT** : Corrections for regains, numerical examples; Hygrometers: Hair and digital hygrometer, factors affecting the regain, effect of moisture on fibre properties, drying oven, shirley moisture meter.

**FIBRE DIMENSIONS:** Fibre length measurement, fibre sorter methods, analysis of sorter diagrams, span length, fibro-graph and uniformity index, fibre fineness, important of fineness, measurement by air flow principle; Micronaire value; Relation between fineness and maturity.

**UNIT - II** **L-9**

**MATURITY AND STRENGTH:** Maturity ratio, maturity count, measurement of maturity of cotton fibres, terminology related to tensile properties of textiles, measurement principles CRL, CRE and CRT; Measurement of fibre strength, pendulum lever principle, stelometer, strain gauge principle, instron tensile tester. Latest testing instruments like AFIS, HVI and their use, measurement principle and different modules with data analysis.

**UNIT - IV** **L-9**

**YARN DIMENSIONS AND STRENGTH:** Yarn numbering system, measurement linear density by skein gauge, wrap reel, beesley's yarn balance, twist factor, effect of twist on yarn and fabric properties, measurement of twist by direct, continuous, take-up twist and twist to break methods, measurement of yarn strength by single yarn test and lea test, CSP and RKM, effect of yarn friction in textile industry, measurement of friction, by yarn-on-yarn friction, uster zweigle friction tester.

**UNIT - V** **L-9**

**MEASUREMENT OF HAIRINESS:** Measurement of hairiness by shirley yarn hairiness tester, zweigle G565 and Uster tester 3 hairiness meter; Evenness testing of silvers, roving and yarns; Analysis of periodic variations in mass per unit length, Index of irregularity, limit irregularity, addition of irregularities, evenness tester (uster evenness test), random occurring faults (uster classimat), spectrogram, variance length curves analysis, causes and effects of irregularity.

## LABORATORY EXPERIMENTS

**LIST OF EXPERIMENTS:****TOTAL HOURS: 30**

1. Determination of moisture regain of different fibers.
2. Determination of Fiber maturity by NaOH swelling method.
3. Determination of Fiber length by bear sorter and interpretations by other methods.
4. Determination of Fiber fineness by ATIRA fineness tester.
5. Determination of Fiber strength by Stelometer.
6. Determination of Yarn count by Beesley's yarn balance.
7. Determination of Yarn count by wrap reel.
8. Determination of Single and plied yarn twists.
9. Determination of single yarn strength.
10. Determination of lea CSP and CCSP of single yarn.
11. Determination of yarn diameter by microscopic method.
12. Determination of lint index of cotton fibers.
13. Determination of fiber orientation by Lindsley technique.
14. Determination of fiber properties using AFIS (Industry visit is needed).
15. Determination of yarn friction.

**TEXT BOOKS:**

1. J. E. Booth, "Principle of Textile Testing", 3<sup>rd</sup> edition, CBS Publisher, 1996.
2. B. P. Saville, 'Physical Testing of Textiles', 1<sup>st</sup> Edition, Woodhead Publishing, Limited, 1999.

**REFERENCE BOOKS:**

1. ArindamBasu, "Textile Testing", Sitra Publishers, Coimbatore, 2004.
2. Grower and Hamby, "Hand Book of Textile Testing", Textile Institute, 1996.
3. Keshavan and Angappan, "Physical Testing", Vol- I & II, SSMITT Publications, Komarapalyam, 1993.
4. V.K. Kothari, "Developments in Textile Testing", I B Publishers, New Delhi.