GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)
SUBJECT NAME: ADVANCED PHYSICAL TESTING
SUBJECT CODE: 2172909
B.E. 7th SEMESTER

Type of course: Engineering

Prerequisite: Students should have knowledge of physical testing.

Rationale: This course covers different advanced techniques developed for the testing of fibres, yarns and fabrics.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; AL-Active learning assignments; OEP-Open Ended problem

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	Advanced material testing like NMR, XRD, Infrared Spectrum, DSC, birefringence, sonic modulus, etc.	7	16.67
2.	Single fibre strength testers, testing for filaments.	7	16.67
3.	Advanced testing for yarns like friction of yarn, applications of Tensojet, Classimat etc. Modern methods of Testing for irregularities and interpretation of data.	7	16.67
4.	Advanced fabric testing. Serviceability testing, testing for comfort properties.	7	16.67
5.	Fabric Objective evaluation methodologies like Kawabata & FAST.	4	9.52
6.	Testing for Technical textiles	6	14.29
7.	Quality management in textiles	4	9.52

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	12	12	12	12	12

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Physical Testing of Textiles by B. P. Saville, 1999, Woodhead Publishing Ltd., U. K.
2. Principles of Textile Testing by J. E. Booth, 1961, Heywood Books, London.
3. Testing and Quality Management – Edited by V. K. Kothari, IAFL Publications, New Delhi.
4. Handbook of Textile Testing and Quality Control by E. B. Grover and D. S. Hamby.
5. Textile Testing by Angappan P & Gopalakrishnan R, SSM Institute of Textile Technology, Komarapalayam, 2002.
6. Textile Testing by Basu A, SITRA Coimbatore, 2002.

Course Outcome:

After learning the course the students should be able to:

1. Describe advanced material testing methods.
2. Describe the methods of testing different types of yarns.
3. Explain the fabric objective evaluation methodologies.
4. Explain how to test the technical textiles.

List of Experiments:

1. Determination of threads per inch of the given fabric using densi meter
2. Determination of threads per inch of the given fabric using pick glass
3. Calculate threads per inch of double cloth
4. Determination of thickness of given fabric using thickness gauge
5. Determination of GSM of the given sample using quadrant balance
6. Determination of GSM of the given sample using gravimetric method
7. Determination of crimp percentage of given fabric using crimp tester
8. Determination of flexural rigidity and bending modulus of the given fabric using stiffness tester
9. Determination of drape of the given fabric using drape tester
10. Determination of crease recovery angle of the given fabric using crease recovery tester
11. Determination of pilling resistance of the given fabric by pill box method
12. Determination of pilling resistance of the given fabric by the abrasion method
13. Determination of abrasion resistance of the given fabric using abrasion tester
14. Determination of fabric strength of the given fabric using UTM
15. Determination of bursting strength of the given fabric using bursting tester
16. Determination of tearing strength of the given fabric using KMI tearing tester

Design based Problems (DP)/Open Ended Problem: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. Develop a template for measuring GSM of fabric.
2. Develop a system showing the principle of working of abrasion tester.
3. Develop a prototype device to measure the drape of fabric.

Major Equipment:

1. Tensile tester
2. Drape meter
3. Pilling tester
4. Abrasion tester
5. Tearing strength tester
6. Bursting strength tester
7. Fabric stiffness tester

List of Open Source Software/learning website:

- Various Web sites of textile testing instrument manufacturers
- BIS, BS, ASTM and other standard methods of textile testing.
- http://nptel.iitm.ac.in, World Wide Web, Google Search Engine etc.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.