GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE PROCESSING (28)
CHEMICAL AND PHYSICAL ANALYSIS OF TEXTILES
SUBJECT CODE: 2162807
B.E. 6thSEMESTER

Type of course: Textile Processing Engineering

Prerequisite: Zeal to learn the subject

Rationale: This subject includes the complete physical and chemical analysis of textile fibres as per their textile applications. The analysis can be done at any stage whether fibre, yarn or fabric. Fibre blends can also be evaluated with the same techniques modifying them to certain extent.

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

Content:

Sr. No.	Course content	Total Hrs.	% Weightage
	Chemical Analysis of Textiles		
1	Fibre Identification by using different chemical reagents, End group analysis of fibres.	04	7
2	Determination of saponification value of polyester, melting point, molecular weight measurements, Refractive index and Birefringence etc of different fibres.	06	11
3	Determination of moisture related properties such as absorbency, moisture retention and moisture regain etc textile materials.	03	5
4	Analysis of fibre blends: Various methods such as microscopic, mechanical, chemical, etc., Factors affecting accuracy of quantitative analysis of fibre blends, Correction factors, Methods of quantitative analysis.	10	18
5	Determination of size content, Fee formaldehyde and resin content in textiles.	05	9
	Physical Analysis of Textiles		
6	Aim and scope of testing, Measurement of twist, length, fineness, crimp, count, Hairiness of yarn, Yarn numbering systems and conversions.	10	18
7	Determinations of foreign matter, Maturity of fibres.	02	3
8	Testing of Tensile Property of fibres, Yarns & fabrics, Fabric thickness, Compressibility, Resilience, Rigidity, Drape & other properties, Associated with the fabric handle, Cloth tear test & test for bursting strength & resistance to wear of textile materials.	10	18
9	Measurement of yarn & sliver irregularity, Test for air permeability & thermal transmission.	06	11

Suggested specification table with marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
08	14	16	12	12	08

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. Chemical Testing of Textiles - David M. Hall
2. Profiles in Chemical Analysis - N. F. Desai
3. Evaluation of Textile Chemicals - V. A. Shenai
4. Principles of Textile Testing - Booth J. E.
5. Textile Testing - Angappan

Course outcome:

After learning the content of the subject the students will be able to:

1. Identify any unknown fibre sample even if will be present in blend form.
2. Determine various properties of synthetic fibres like saponification number, melting point, refractive index, etc.
3. Modulate the recipes for pretreatments determining the size content, wax content, etc.
4. Understand about the yarn numbering system to describe the fineness of textiles.
5. Measure the basic characteristics of fibres, yarns or fabrics like twist, EPI, PPI, GS, etc.

List of Experiments:

1. Identification of given different fibers. Natural fibers.
2. Identification of given different fibers. Synthetic fibers.
3. Identification of given different fibers. Regenerated fibers.
4. To study the microscopic view of different fibers.
5. To study the efficiency of wetting agents.

Design based Problems (DP)/Open Ended Problem:

1. To standardize effect of AEG content on dyeing bahaviour of Nylon textiles.
2. To compare various natural and synthetic fibres for pilling tendancy.
3. To study efficiency of various finishing agents based on their structure.
4. To study the effect of fabric weaves on their performance.
5. To study the effect of polymerization technique on molecular weights of the same.
6. To study about molecular irregularity affecting various properties of the polymers to achieve maximum efficiency.

Major Equipments:

Bunsen burner, Water heating bath, Weighing balance, Microscope, Oven, etc.

List of Open Source Software/learning website:

1. http://www.wto.org/
2. http://www.wtin.com/
3. http://textileinformation.blogspot.in/
4. http://www.fibre2fashion.com/
5. http://textilelearner.blogspot.in/
6. http://www.fashion-era.com/

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.