

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE PROCESSING (28) ANALYTICAL TEXTILE CHEMISTRY – I SUBJECT CODE: 2152803 B. E. SEMESTER: V

Type of course: Textile Processing Engineering

Prerequisite: Zeal to learn the subject

Rationale: This subject includes various analytical test methods involved with basic chemistry applied in textile wet processing viz. measurement of pH, different types of titrations, stains, etc. This course also involves the complete analysis of indispensable part of textile processing i.e. water, fuel, etc. and analysis of effluent developed through.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)	ALA	ESE (V)	OEP	PA (I)		
3	0	3	6	70	20	10	20	10	20	150

Content:

Sr. No.	Course content	Total Hrs	% Weightage
1	Analysis of Coal, Thermic Fluid and Furnace Oil	05	12
2	Analysis of antistatic oils & lubricating oils	05	12
3	Analysis of water: Raw water, Softened water, Effluents	10	24
4	Analysis of various basic chemicals used in Textile Processing	05	12
5	Identification of stains and their removal	02	4.5
6	Analytical and Instrumental methods used in textile analysis such as Conductometric and Potentiometric Titrations, spectrophotometry, colorimetry, Chromatography, Ion-exchange, Electrophoresis, Viscometry, Osmosis, etc.	15	35.5

Suggested specification table with marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	12	16	10	10	10

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. Evaluation of Textile Chemicals - Shenai V. A.
2. Process House Laboratory: A Hand Book - Luthra & Deshpande

3. Treatment of Textile Processing Effluents Including Analysis - Manivasakam
4. Profiles in analysis of chemicals - N. F. Desai
5. Essentials of physical chemistry - Bahl & Tuli

Course outcome:

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

1. Understand the importance of analysis of various chemicals used.
2. Find the purity of different basic chemicals they use.
3. Decide the best analytical technique to be used for the said requirement.
4. Get the requirement of water to be used in textile wet processing.
5. Depict the harmfulness of effluents getting disposed in conventional sources of water.
6. Treat the effluents generated by textile processors for its easy dispose.

List of Experiments:

1. To determine the % purity of Sodium Hydroxide.
2. To determine the % purity of Sodium Carbonate.
3. To determine the % purity of Sodium bicarbonate.
4. To determine the % purity of Trisodium phosphate.
5. To determine the % purity of Hydrochloric Acid.
6. To determine the % purity of Hydrochloric Acid.
7. To determine the % purity of Acetic Acid.
8. To determine the % purity of Oxalic Acid.
9. To determine the % purity of Tartaric Acid.
10. To determine the % purity of Citric Acid.
11. To determine the % purity of Hydrogen Peroxide.
12. To determine the % purity of Sodium Hypochloride.
13. To determine the % purity of Sodium Hydrosulphite.
14. To determine the % purity of Sodium Sulphide.
15. To determine the % purity of Safoline.
16. Analysis of water (Colour, Odour, ph, Hardness, Chlorine Ions, Acidity, Alkalinity, Total Solid, Total Dissolved Solids, etc.)
17. Analysis of thickeners.
18. To measure wetting efficiency of wetting agents using drave's test.
19. To determine gross calorific value of coal using bomb calorimeter.
20. To determine biodegradable oxygen (BOD) of given water sample.

Design based Problems (DP)/Open Ended Problem:

1. To analyse the usage of fuel with its conservation in any industry.
2. To study ecological and economical aspects of chemicals and auxiliaries considering their purity.
3. To formulate the best method for effluent treatment to reuse water out of it.
4. To compare different analytical methods for any application.
5. To evaluate water for its use in any treatment according to their constituents.

Major Equipments:

Scientific balance, Oven, Muffle furnace, Hot plate, BOD incubator, and various apparatus such as pipettes, burettes, measuring cylinders, beakers, conical flasks, petri dishes 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.