

# GUJARAT TECHNOLOGICAL UNIVERSITY

## TEXTILE PROCESSING (28) TECHNOLOGY OF DYEING – I SUBJECT CODE: 2152802 B.E. 5<sup>th</sup> SEMESTER

**Type of course:** Textile Processing Engineering

**Prerequisite:** Zeal to learn the subject

**Rationale:** This subject introduces the colouration of textiles that includes fundamental aspects of dyeing. It also covers the application of different colouring matters like direct dye, reactive dye, azoic colours, mineral khaki colours, etc. on cotton fibre fabric. It further involves the dyeing of denim fabric in detail.

### Teaching and Examination Scheme:

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

### Content:

Sr. No.	Course content	Total Hrs	% Weightage
1	Importance of dyeing, History of dyeing, Classification of dyeing, Theories of dyeing.	02	5
2	Application mechanism & properties of direct, Reactive, Azoic, Vat, Solubilised vat, Sulphur, Basic dyes, etc on cellulosic fibre fabrics.	30	71.5
3	After treatments of direct & basic dyes.	02	5
4	Dyeing with oxidation colours e.g. - Aniline black & Mineral khaki on Cellulosic fibres	03	7
5	Phthalocyanine colours - Phthalogen blue dyeing on cotton.	01	2.5
6	Denim processing	02	5
7	Faults in dyeing, Their rectification and prevention in above dyeing methods, Use of dye bath assistant and auxiliaries for levelling of shades & migration of dyes.	02	5

### Suggested specification table with marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
17	23	19	04	04	3

**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. Chemistry of dyes & principles of dyeing - Shenai V. A.
2. Technology of dyeing - Shenai V. A.
3. Dyeing & chemical technology of textile fibres - Trotman E. R.
4. Cellulosic dyeing - John Shore

**Course outcome:**

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

1. Clearly understand the concept of dyeing like % shade, M.L.R., T.L.R., etc.
2. Understand the properties and different application methods of colouring matters on the fibrous substrate.
3. Design a dyeing module depending upon the fibre and the dye used.
4. Understand explicitly the role of different chemicals and auxiliaries during dyeing.
5. Know very well the detailed processing method of coloration of denim fabric.

**List of Experiments:**

1. To study the effect of exhausting agent in dyeing of bleached cotton fabric using direct dye.
2. To study the effect of material to liquor ratio in dyeing of bleached cotton fabric using direct dye.
3. To study the effects of percentage shade in dyeing of bleached cotton fabric using direct dye.
4. To carry out dyeing of bleached cotton fabric using cold brand reactive dye.
5. To carry out dyeing of bleached cotton fabric using hot brand reactive dye.
6. To carry out dyeing of bleached cotton fabric using vat dye.
7. To carry out dyeing of bleached cotton fabric using sulphur dye.
8. To carry out dyeing of bleached cotton fabric using naphthol dye.
9. To carry out dyeing of bleached cotton fabric using mineral khakhi dye.
10. To carry out dyeing of bleached cotton fabric using aniline black dye.

**Design based Problems (DP)/Open Ended Problem:**

1. Process optimization to obtain reproducible result.
2. To control parameters to get RFT dyeing.
3. To design dyeing module as per the combination and proportions of fibres in fabric.
4. To assess the compatibilities of dyes when to be used in combination.

**Major Equipments:**

Water heating bath, Weighing balance, Oven, Kier, H.T.H.P. beaker dyeing m/c 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.