

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE PROCESSING (28) CHEMISTRY OF INTERMEDIATES & DYES SUBJECT CODE: 2142809 B.E. SEMESTER IV

Type of course: Textile Processing Engineering

Prerequisite: Zeal to learn the subject

Rationale: This course provides basic idea of different intermediates and their manufacturing processes, used in the synthesis of Dyes. It also gives the knowledge of classification of colourants, their properties and their application methods. Apart from textile, the other areas of applications of these colorants are also explored. The various ecotoxicological effects of synthetic dyes and the chemicals used therein are also covered.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
				PA	ALA	ESE	OEP			
4	0	0	4	70	20	10	0	0	00	100

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

Contents:

Sr. No.	Topics	Total Hrs.	Weightage (%)
01.	Color - Definition, colorimetric terms and theories	2	3
02.	Brief description of intermediates and primary intermediates	2	3
03.	Orientation rules in benzene series.	2	3
04.	Industrial synthesis of intermediates: Purity of raw materials, yield of product.	2	3
05.	Description of individual unit processes: Sulphonation, Nitration, Halogenation, Oxidation, Reduction, Alkali fusion - Definition, Reagents, Bucherer reaction, Alkylation- Definition, Friedel crafts reaction, Diazotization	10	20
06.	Classification and chemical constitution of dyes. Synthesis of dyes from intermediate compounds to mono & Diazo dyes, Coupling of diazotized amines, etc.	10	20
07.	Characteristic properties, synthesis & application of Ionic & non-ionic dyes like Direct, Vat, Acid, Disperse, Azoic, etc.	10	20
08.	Characteristic features, Synthesis & uses of dyes like Nitro dyes, Acridine & Azo dyes, etc.	10	20
09.	Colourless dyes: Concept and classification of fluorescent dyes.	2	4
10.	Non-textile dyes: Food, leather, paper, hair dyes, etc.	2	4

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks

R Level	U Level	A Level	N Level	E Level
24	18	22	04	02

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate 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:

Sr. No.	Title	Author
01.	Chemistry of dyes & principles of dyeing	V. A. Shenai
02.	Synthetic dyes	G. R. Chatwal
03.	Colorants and pigments	John Shore
04.	Modern technology of textile dyes and pigments	H. Panda
05.	Handbook of synthetic dyes	A. M. Shah

Course outcome:

After learning the course, the students should be able to:

1. Understand the basics of various raw materials and intermediates used in the manufacturing of Dyes.
2. Understand the technical aspects of various unit operations employed in the manufacturing of different intermediates.
3. Understand the basis of classification of different colouring matter.
4. Understand the technical aspects of different manufacturing methods employed in the synthesis of dyes.
5. Understand different application methods of dyes on textiles.
6. Get the knowledge of areas of non textile applications of Dyes such as leather, paper, food etc.
7. Understands the concept and classification of colorless dye e.g. Optical brightening agents.
8. Understand Color i.e. definition, colorimetric terms and different colour theories.
9. Get the knowledge of current scenario of Dyestuff industries.
10. Understand ecotoxicological effects of dyes and the chemical used therein on environment.

Major Equipments: NA

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.