

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: TEXTILE PROCESSING
SUBJECT NAME: ECOLOGICAL ASPECTS IN TEXTILE PROCESSING
(DEPARTMENTAL ELECTIVE - II)
SUBJECT CODE: 2172805
B.E. 7th SEMESTER

Type of course: Textile Processing Engineering

Prerequisite: Zeal to learn the subject

Rationale: This subject deals with the impact of various unit operations of textile processing on environment such as global warming, air and water pollution and health hazard. This covers various ecological aspects such as types of pollution, causes of pollution, waste minimization and measures to reduce the pollution load. Eco standards, environmental management & auditing (ISO-1400 Family) are also studied in this subject.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	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	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; OEP-Open Ended problem; AL-Active learning.

Content:

Sr. No.	Content	Total Hrs	Weightage (%)
1.	Environment & Ecology: Environment, ecology, types of pollution & their impacts. Ecofriendly textiles, effects of textile effluents on plant & animal life.	05	13.9
2.	Waste Minimisations in Textile Industry: Dry Processes, wet processes, dyestuff industry, environmental considerations, red listed chemicals, metals, dyes. Limits of banned chemicals, metals, dyes & other parameters. List of presently known chemicals/auxiliaries /dyes commonly used in textile processing which are eco- unfriendly.	05	13.9
3.	Towards Eco-Friendly Chemical Processing: Desizing, scouring, bleaching, mercerizing, dyeing, printing & finishing, future developments in eco-friendly chemical processing.	04	11.1
4.	Pesticides in fibre/yarns, eco-specifications for pesticides, analysis & testing.	03	8.3
5.	Heavy metals in textiles, eco-standards for heavy metals, testing of heavy metals.	03	8.3
6.	Pentachlorophenol (PCP) In Textiles: Sources of PCP, toxicity of PCP, eco specifications for PCP, testing of PCP, substitutes for PCP.	04	11.1

7.	Formaldehyde: Toxicity, sources of HCHO, eco-limits for formaldehyde, evaluation of formaldehyde content in finished textile etc.	05	13.9
8.	Eco-Standards: Different eco-labels viz. MST, MUT, Steilmann etc. Eco standards for textiles under different Eco-Labels.	04	11.1
9.	Environmental management & auditing (ISO-1400 Family)	03	8.3

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	10	8	16	16	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. Environment, Ecology, Effluent- Dr. R.S.Gandhi
2. Eco- parameters: Present status - Sussana Benny & K. P. Janakrishnan SITRA, Coimbatore
3. Environmental Problems in Chemical Processing of Textiles - S. A. Solekar, Yogita, NCUTE, IIT, Delhi.

Course Outcome:

After learning the course the students should be able to:

1. Understand the basics of ecology and various techno chemical aspects.
2. Understand the causes of global warming, pollution and health hazard due to various unit operations of pollution.
3. Understand the waste minimization and precautionary and remedial measures to reduce the pollution load.
4. Understand the importance of eco labels, environmental management and auditing.

List of Experiments:

1. To determine the dissolved oxygen in the given different water samples by Winkler method.
2. To determine the percentage of iron by nitration method of the given different water samples.
3. To determine the alkalinity of the given different water samples.
4. To determine the chemical oxygen demand of the given effluent (Polluted water).
5. To determine the chlorine content of the given different water samples.
6. To determine temporary and permanent hardness of the given different water samples.
7. To determine the biodegradable oxygen demand of the given effluent (Polluted water).
8. To determine the chloride content of the given different water samples.
9. To determine the silica content of the given different water samples.
10. To determine the iron content of the given different water samples.

Design based Problems (DP)/Open Ended Problem:

1. To prepare the models of green house effect and global warming.
2. To prepare models indicating the influence of textile processing industry on ecology.
3. To prepare a model of modern effluent treatment plant.
4. To prepare a models of eco processing of textiles.

Major Equipment: Muffle furnace, BOD incubator, Oven, Visible spectrophotometer, Electronic balance, Glass apparatus 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.