TEXTILE CHEMISTRY

Semester	Subject Code	Category	Lecture Hours		Theory hours		Practical hours		Credits
			Per week	Per sem.	Per week	Per sem.	Per week	Per sem.	
V	21CCH5Ea	Elective-II (Option-2)	3	45	3	45	-	-	3

COURSE OBJECTIVES:

The students will be able to

- Gain knowledge about the classification, structure, production, properties and applications, color and constitution of dyes and concept of dyeing, printing, finishing concepts in textile industry.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Understand the classification, structure, production, properties and applications of natural fibers and man-made fibers.	K4
CO2	Understand the structure, synthesis, properties, tests and applications of various synthetic fibers.	K4
CO3	Identify Impurities in fibers and removal methods and learn the principles, bleaching methods, desizing, dyeing and dying processes and fastness properties.	K3
CO4	Gain knowledge about the concepts of chromophores, auxochromes valance band theory of color and to identify different types of azo dyes, synthesis, structure and uses of azo dyes.	K3
CO5	Learn the printing, processes, finishing and mercerizing processes, environmental issues and protection.	K3

*CO – course Outcomes

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	S	S
CO2	M	S	S	S	S	S
CO3	S	S	S	M	S	S
CO4	S	M	S	S	S	S
CO5	S	S	S	S	M	S

(S – Strong; M – Medium; L – Low)

UNIT – I: Properties of Fibers **9 Hours**

1.1 Introduction– Definition – Classification–Production – Properties – Count, denier, tex, staple length, spinning properties, strength, elasticity and creep of natural and man-made fibers.

1.2 Chemical structure and applications of natural cellulose fibers (cotton, jute) – General characteristics of natural protein fibers (wool and silk) – Action of chemicals on fibers.

UNIT – II: Structure of Fibers **9 Hours**

2.1 Chemical structure, preparation and properties of synthetic fibers – Polyamide fibers – Polyester fibers – Polyacrylonitrile fiber – Vinyl fibers – Elastomeric fibers –Mineral and metallic fibers.

2.2 Identification tests for cellulose, cotton, wool, silk, rayon, acrylic, viscose, polyamide and polyester fibers – Methods of structural, physical, chemical characterization of fibers.

UNIT – III: Technology of Dyeing **9 Hours**

3.1 General principles of removal, scouring – Purpose, alkali scouring and acid scouring Impurities in raw cotton and grey cloth, wool and silk – Bleaching (methods – Hypochlorite, peroxide and bleaching powder) – Desizing (hydrolytic and enzymatic), kier boiling and chemicking.

3.2 Dyeing – Dyeing of wool with acid dyes – Dyeing of silk, nylon and acrylic with basic dyes – Dyeing of polyester with disperse dyes – Fiber swelling – Carrier dyeing – High temperature dyeing – Selection of dyestuff – Fastness properties of dyed materials.

UNIT – IV: Dyes **9 Hours**

4.1 Colour and constitution – General treatment – Chromophores – Auxochromes, bathochromes and hypsochromes – Valance bond theory of colour – Classification of dyes – Acidic, basic, direct, mordant, azoic, ingrain, vat and reactive dyes.

4.2 Classification as per Chemical constitution – Azo dyes – Triphenyl methane dyes, Phthalein dyes, Indigo and Anthraquinone dyes – Structure, preparation and uses of Methyl orange, Phenolphthalein and Malachite green.

UNIT – V: Printing Technology **9 Hours**

5.1 Printing – Ingredients in printing paste - Printing methods - Direct – Resist – Discharge – Transfer printing – Finishing – Finishes given to fabrics – Mechanical finishes on cotton, wool and silk.

5.2 Method used in process of mercerizing – Anti-crease and anti-shrink finishes – Water proofing – Latest development and environmental issues – Environmental protection.

TEXT BOOKS:

S. No.	Authors	Title	Publishers	Year of publication
1.	Max M. Houck	Identification of Textile Fibers	CRC Press, Woodhead Publishers	2009
2.	A. J. Hall	A Students Textbook of Textile Science.	Allman Publishers	1963

REFERENCE BOOKS:

S. No.	Authors	Title	Publishers	Year of publication
1.	Maryory L. Joseph.	Introduction to Textile Science	Holt, Rinehart and Winston	1977
2.	R. H. Peters	Textile Chemistry – Vol. II	*Elsevier* Amsterdam	1967
3.	E. R. Trotman	Dyeing and Chemical Technology of Textile Fibers	Charles griffin and Co. Ltd.	1985
4.	V. A. Shenai	Chemistry of Dyes and Principles of Dyeing	Sevak Publications	1977
5.	E. R. Trotman,	Scouring and Bleaching	Charles Griffin and Co. Ltd.	1989
6.	Howard L. Needles	Textile Fibers, Dyes, Finishes, and Processes	Noyes Publications, Mill Road, Park Ridge, New Jersey	1986

TEACHING METHODOLOGY:

- Chalk and board teaching
- Power point presentation
- Group discussion
- Seminars
- Assignments

SYLLABUS DESIGNER:

Dr. N. Dhanam, Assistant Professor of Chemistry