

# Gujarat Technological University

## COURSE NAME : FIBER SCIENCE

### 1. RATIONALE :

This subject provides knowledge regarding basic fiber chemistry with their natural/synthetic sources and manufacturing methods. It also provides clear concept of physical and chemical properties of various natural and manmade fibers to enable him to process them according to required end uses of Textiles.

### 2. SCHEME OF TEACHING:

Topic No.	Name of Topic	No. of Hours		
		Lect.	Pract.	Total
1.	Introduction and classification of fibers	02	-	02
2.	Natural Fibers	15	--	15
3.	Semi Synthetic Fibers	15	--	15
4.	Synthetic Fibers	16	--	16
5.	Other Fibers	08	--	08
Total		56	--	56

### 3. TECHNOLOGY RELATED SKILLS AND ENABLING OBJECTIVES:

#### TRS:1 Classify Textile Fibers: (Topic 1)

EOs

- 1.1 Define Textile Fibers.
- 1.2 Enlist Textile Fibers according to the source.
- 1.3 Enlist Textile Fibers according to constitutional groups.

#### TRS:2 Explain Natural Fibers: (Topic 2)

EOs

- 2.1 Discuss constitutional nature of Cotton, Wool, Silk and Jute.
- 2.2 Give physical and chemical properties of above mentioned fibers.

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## **TRS:3 Understand Semi Synthetic Fibers:**

**(Topic 3)**

EOs

- 3.1 Select and use appropriate method of manufacturing of viscose rayon, polynosic rayon, cuprammonium rayon and Acetate rayon.
- 3.2 Give physical and chemical properties of above mentioned fibers.

## **TRS:4 Understand Synthetic Fibers:**

**(Topic 4)**

EOs

- 4.1 Select and use appropriate method of manufacturing of polyamide fibers like nylon-6 and nylon-66; polyester fibers like terylene, Dacron; poly Acrylonitrile fibers like orlon, Cashmilon etc.
- 4.2 Give physical and chemical properties of above mentioned fibers.

## **TRS:5 Explain Specific utility fibers:**

**(Topic 5)**

EOs

- 5.1 Study brief manufacturing stages of polypropylene, High density Low density polyethylene, P.V.A., carbon fiber, glass fiber, polyurethane fibers.
- 5.2 Give physical and chemical properties of above mentioned fibers.

## **4. COMMUNICATION SKILLS:**

1. Explain salient features of Fiber manufacturing processes.
2. Describe an object and process.
3. Counsel people in work situations.
4. Convince persons about fiber behavior in process.
5. Present oral summaries of topics read/heard.

## **5. TOPICS AND SUBTOPICS:**

### **1 INTRODUCTION AND CLASSIFICATION OF FIBERS:**

- 1.1 Define Fibers.
- 1.2 Classification of textile fibers according to source from where they are obtained.

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- 1.3 Classification of textile fibers according their constitutional groups.

## 2 NATURAL FIBERS:

- 2.1 Structure of Cotton, Wool and Silk fibers.
- 2.2 Physical and chemical behavior of Cotton/ Wool/ Silk fibers.
- 2.3 Uses of above fibers.

## 3 SEMI SYNTHETIC FIBERS:

- 3.1 Definition of semi synthetic fibers.
- 3.2 Differentiation of natural and semi synthetic fibers.
- 3.3 Describe manufacturing process of viscose rayon, Cuprammoniumrayon, polynosic rayon, Acetate rayon.
- 3.4 Physical & chemical properties of above fibers.
- 3.5 Uses of above sami synthetic fibers.

## 4 SYNTHETIC FIBERS:

- 4.1 Definition of synthetic fibers.
- 4.2 Differentiation of semi synthetic & Synthetic fibers.
- 4.3 Manufacturing process of different types of Nylons, Polyester,CDPET and Polyacrylonitrile fibers.
- 4.4 Physical and chemical properties of above fibers.
- 4.5 Uses of above synthetic fibers.

## 5 OTHER FIBERS:

- 5.1 Importance of specific utility fibers.
- 5.2 Brief study of poly propylene, polyethylene, P.V.A.,

polyurethane, carbon fiber and glass fiber.

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## 6. SUGGESTIVE INSTRUCTIONAL STRETEGIES:

No.	TRS	EO's	Instructional Strategies	Key Resources needed	Remarks
1	1	1.1	Classroom instructions Demonstration	Charts Transperances Slides	
2		1.2	"	"	
3		1.3	"	"	
4.	2	2.1	"	"	
5.		2.2	"	"	
6.	3	3.1	"	"	
7.		3.2	"	"	
8.	4	4.1	"	"	
9.		4.2	"	"	
10.	5	5.1	"	"	
11.		5.2	"	"	

## 7. REFERENCES:

Sr.No.	Name of books	Authors
1.	Textile fibers	V.A.Shenai
2.	Man made fibers	Moncrieff
3	Textile chemistry vol. I & II	R.H.Peters
4.	Dyeing & chemical Technology of Textile fibers	E.R.Trotmann
5.	Introduction to macromeleenar science	Amstrong
6.	Textile fibers	Textile association India, A'bad unit.