

16TF404 TECHNICAL TEXTILES

Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	-	-	10	-	-	-	20	-



Course Description and Objectives:

This course offer functional use of textile instead of aesthetic applications. It starts with the classification, manufacturing techniques and material used for the technical applications. Then it introduces the use of technical textiles in defense, medical and transportation applications. Objective of this course is to impart knowledge and skill in the application of technical textiles in various sectors.

Course Outcomes:

The student will be able to:

- know the properties and technical aspects of different types of yarn and fabric.
- understand the requirement of defense clothing and principles of camouflage fabric.
- learn the application of textiles in medical field, transportation and in construction.
- identify the type of fibre and arrangement of cord ply for different types of fibre.
- explain the manufacturing, properties and applications of high performance fibre.
- correlate the function and properties of geo-textiles for specific applications.

SKILLS:

- ✓ *Correlate properties of yarn, fabric and fabric structure to the end applications*
- ✓ *Identify fibre, chemical coating and printing for camouflage system*
- ✓ *Select textile materials and process for medical textiles.*
- ✓ *Identify the high performance fibre and its manufacturing parameters for particular use.*
- ✓ *Select fibre, fabric and resin in case of textile reinforced composite for specific application.*

ACTIVITIES:

- *Collection of fibres used for a mulch mat/ geo-textile/ sutures/for various applications..*
- *Design a fabric structure for a ballistic armor/ geo-textile/seat belt.*
- *Interpret the results of permittivity and transitivity to the fabric thickness.*
- *Analyse baby diaper/carry bag/tyre cord/ other technical textiles product.*
- *Analyse shed cover, its design, coating and related information.*

UNIT – 1**L-10**

GENERAL TECHNICAL TEXTILES : Classification of textiles according to tailor made, Brief note on technical yarns, fabrics, and fabric structures, Scope of industrial textiles, Influence of man-made fibre, manufacturing techniques of industrial textiles, Industrial sewing threads and their manufacture, Nomenclature, Textiles in agriculture, diary and horticultural, Textiles in cigarettes, Paper machine clothing - structure and manufacture of former, drier and wet felts, requirements of these felts, Textiles in conveyor belting and power transmission.

UNIT - 2**L-9**

TEXTILES FOR DEFENSE & SURVIVAL : Requirements, Canvas for defense, Combat clothing system, Water vapor permeable clothing, Breathable clothing, Camouflage systems, Colour and patterns, Camouflage for visible, UV, near IR, far IR, Deceptions, Decoys, Cut resistant textiles, Protective clothing for extremely cold region, Ballistic protective armours and accessories, Introduction to aerospace Textiles, Fabrics for nuclear, biological and chemical protection.

UNIT - 3**L-8**

MEDICAL TEXTILES : Brief study of applications of textiles in medical field : Classification, Sutures, Surgical drapes, masks, Hospital textiles, Textiles for orthopedics.

TEXTILES IN TRANSPORTATION : Tyre cord ,Cross section of passenger tyre, Manufacture of tyre cords, Types of tyres, Textiles in parachute applications, hose canvas, duck fabrics. Introduction to textile in automobile, Seat belt, Airbag.

UNIT - 4**L-9**

HIGH PERFORMANCE FIBRES : Manufacture, Properties and applications of Basalt, ultra high modulus fibres like aramid and carbon.

TEXTILES IN FILTRATION, SPORTS, ACOUSTICS : Textiles in filtration media, methods of filtration, selection of textiles for filtration, Coated fabrics and high performance coated fabrics, fabric structure for coated fabrics, coating materials and methods, Textiles in acoustical applications, Textile materials in sports and recreations.

UNIT - 5**L-9**

TEXTILES IN CONSTRUCTION : Geo-textiles, Requirements, Properties, Functions, Applications, Testing of Geo-Textiles. Fabrics, Architectural fabrics, Building structure, Awnings and Canopies.

TEXTILES IN COMPOSITES : Textile Reinforced Composites, Woven, Knitted and Nonwoven fabric reinforcements - Properties, Mechanics; High performance PP composites, Hybrid yarns for composites.

TEXT BOOKS:

1. A. R Horrocks, S.C. Anand, "Handbook of Technical Textiles", 2nd edition, Woodhead Publishing, Cambridge, 2000.
2. S. Adanur, "Handbook of Industrial Textiles", 2nd edition, Technomic Publication, Lancaster, 2001.

REFERENCE BOOKS:

1. M.C. Kanna, "Design and Manufacture of Textile Composites", Textile Progress", Manchester, April 2004.
2. Shishoo, "Textile in sports", Textile progress, Manchester, August 2005.
3. Fung W., Collins & Aikman, "Textiles in Automotive Engineering", 2nd edition, Wood Head Publishing Ltd., UK, 2000.