

DSC-ADC-1: Understanding Fabrics

CREDITS: 4 (THEORY 3, PRACTICAL 1)

(Theory 45 Periods; Practical 30 Periods)

LEARNING OBJECTIVES:

1. To impart knowledge regarding production, properties and usage of textile fibres and yarns
2. To apprise the learners about the various techniques of fabric production and their properties
3. To familiarise the students with the concepts related to fabric finishes and quality.

COURSE OUTCOMES:

After completing this course, the learner will be able to:

1. Classify textile fibres based on length and origin.
2. Identify different types of textile fibres using various tests.
3. Compare and select fabrics for different end uses based on their properties
4. Describe the properties of textile yarns based on their characteristics
5. Identify different textile fabrics based on their construction
6. Refer to fabrics by their popular trade names and their characteristics
7. Select fabrics for different end uses based on their regular and functional finishes
8. Describe the desirable fabric properties for garment construction
9. Inspect the fabrics and identify the quality related problems.

THEORY

(Credits: 3; Periods 45)

Unit I: Textile Fibres

10 Lectures

Unit Description:

This unit provides basic knowledge of textile fibres to create a better understanding of the properties and end use of the fabrics made from different fibres

Sub Topics:

1. Textile Fibre classification based on their Origin (natural and man-made) and Length (staple and filament)
2. Identification of textile fibres through Physical examination (Visual and Feeling test), Burning test, Microscopic test, Chemical test
3. Natural and Manmade Fibres - Properties and end-uses (Cotton, Linen, Wool, Silk, Rayon, Acetate, Nylon, Polyester, Acrylic, Spandex)
4. Newer Fibres – Properties and end uses

Unit II: Textile Yarns

10 Lectures

Unit Description:

This unit provides basic knowledge of the yarn making processes and yarn properties to create a better understanding the fabrics made from them.

Sub Topics:

1. Yarn manufacturing process – Basic steps of Mechanical and chemical spinning
2. Types of yarn – Spun, Filament, Simple, Fancy/Novelty
3. Yarn properties – Yarn count, Yarn twist

Unit III: Fabric Construction

15 Lectures

Unit Description:

This unit provides knowledge of the most common fabric construction methods to help in understanding the properties of the fabrics better. This unit also deals with the quality aspects of the fabric and the procedures for checking the required quality specifications of fabrics.

Sub Topics:

1. Fabric construction methods – weaving, knitting, lace, net, Felt and non-woven, braiding – properties and end uses
2. Weaving : Basic loom, parts and operations
3. Basic and fancy weaves – plain, twill, satin, dobby, jacquard, pile, leno, surface figure weaves
4. Knitting: Basic Construction, Characteristics and usage
5. Blended fabrics – Reasons for blending, Properties of common Blended Fabrics
6. Glossary of Common Fabrics
7. Fabric characteristics - Texture, Hand, weight, width
8. Fabric Quality -Fabric inspection systems, Common Fabric defects, Acceptable quality level
9. Visit to Weavers' Service Facility and writing a report on the visit

Unit IV: Fabric Finishes

10 Lectures

Unit Description:

This unit deals with the common routine and functional finishes applied on fabrics to provide a better understanding of fabric performance properties.

Sub Topics:

1. Aims and classification of Fabric finishes
2. Basic/ Routine finishes - Scouring, Bleaching, De-sizing, Singeing, Mercerisation, Tentering, Calendaring
3. Functional finishes - Crease resistant, flame retardant, Anti-microbial, moth proofing

PRACTICAL
(Credit: 1; Periods: 30)

1. Identification of fibres – Physical Examination, Burning Test, Demonstration of Chemical and Microscopic Test
2. Identification of yarns by Visual examination – spun & filament yarns, ply & novelty yarns
3. Analysis of Fabric properties - Dimensional Stability, Thread Count, GSM
4. Calculation of Yarn Count
5. Preparation of samples of basic weaves through paper/ribbon weaving
6. Preparation of a file containing fabric swatches of various Fibres, Yarns, Fabrics, Weaves, Fabric defects.

ESSENTIAL READINGS

- Corbman P.B. (1985). Textiles-Fibre to Fabric. New York: McGraw Hill Book Co.
- Grover E. B. & Hamby D. S., (1969), Handbook of textile testing and quality control, New Delhi: Wiley Eastern Ltd. Handbook of textile testing,
- Rastogi, D. & Chopra, S. (Eds.) (2017). Textile Science. New Delhi, India: Orient Black Swan Publishing Limited.
- Sekhri S. (2013). Textbook of Fabric Science: Fundamentals to Finishing. Delhi, India: PHI Learning.

SUGGESTED READINGS:

- Allec C., Johnson I., Joseph P. (2011). Fabric Science (6th Edition). New York: Fairchild Publications.
- Bureau of Indian standards, (1990), Testing and grading of textile fibers, Part I-III, New Delhi
- Tortora (1992) Understanding Textiles. 4th Ed., New York Macmillan Publishing Company
- Verma P. (2003). Vastra Vigyan Evam Paridhan. Bhopal: Hindi Granth Academy.