Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Institute of Design
Semester-3

Subject: Fabric Science DDEFN13211

Type of course: Multidisciplinary

Prerequisite: Basic knowledge of science (especially chemistry), familiarity with textile terms, and an understanding of fabric use in fashion or design are helpful. Basic computer and research skills are also recommended.

Rationale: Textile Science is essential for understanding the structure, properties, and performance of textile materials. This knowledge forms the foundation for design, production, and innovation in the fashion and textile industry. The course helps students make informed choices in fiber selection, fabric construction, and finishing processes. It bridges the gap between creative design and technical functionality, ensuring quality and sustainability in textile products.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
2	0	4	4	60	30	10	20	30	150

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course content

Sr. no.	Course content
1	**Unit –1 Introduction of Textiles.** 1.1 Definition and Classification of Textiles 1.2 Importance of Textile Science in Fashion and Design
2	**Unit -2 Textile Fiber** 2.1 Introduction to Textile Fibers 2.2 Classification of Fibers 2.2.1 Natural Fiber 2.2.2 Man-Made Fiber 2.3 Properties of Fibers 2.3.1 Primary Properties of Textile Fibers 2.3.2 Secondary Properties of Textile Fibers 2.4 Manufacturing Process, Properties and Uses of Natural Fibres 2.5 Manufacturing Process of Man-Made Fibre 2.6 Man Made Fibre Production (Chemical Spinning)
3	**Unit– 3 Yarn Construction** 3. 1. Classification of yarn 3. 2. Yarn Properties 3. 3. Types of yarn package 3. 4. Yarn Numbering Systems 3. 5. Types of Yarn Textures 3. 6. Yarn Manufacturing
4	**Unit– 4 Fabric construction** Techniques of fabric manufacture: 4.1 Weaving 4.1.1 Working of loom 4.1.2 Types of Loom 4.1.3 Fabric Weaves and Properties 4.2 Knitting 4.2.1 Knitting needle 4.2.2 Classification of knitting 4.2.3 Knitting Machine: A. Weft knitting B. Warp knitting 4.3 Non-woven 4.3.1 Production 4.3.2 End-uses of Nonwovens 4.3.3 Felt

	4.3.4 Net like structures 4.3.5 Fabrics from yarns 4.4 Braiding and lace-making
	Unit 5-Finishing 5.1 Definition of finish 5.2 classification of finishes 5.3 some common finishes
	Unit 6- Dyeing and printing 6.1 Dyeing definition 6.2 Dyeing stages: fiber, yarn, fabric, and garment 6.3 Dye types: natural and synthetic 6.4 Printing techniques: Block, screen, rotary, digital, tie and dye, batik Marbling, stencil, vegetable printing

Continuous Assessment:

Sr. No.	Active Learning Activities	Marks
1	Fabric identification and classification via swatch kits	10
2	Let students perform tie and dye, vegetable printing, **or** basic finishing (starching) on small fabric samples.	10
3	Students create basic woven samples (plain, twill, satin) using a simple loom or cardboard frames.	10
	Total	30

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluae (E)	Create (C)
Weightage	16%	25%	16%	16%	13%	12%

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.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand the basic concepts and classifications in textile science and the importance of textiles in fashion and design.
CO2	Identify and describe various types of textile fibers, their properties, manufacturing processes, and their end uses in the industry.
CO3	Explain yarn construction techniques including classification, properties, textures, yarn numbering systems, and manufacturing processes.
CO4	Understand and demonstrate various fabric construction methods such as weaving, knitting, non-woven, lace-making, and analyze their properties and applications.
CO5	Apply knowledge of dyeing, printing, and finishing techniques to assess quality, performance, and sustainability of textile materials in fashion and apparel products.
CO6	Perform basic dyeing and printing techniques to create colored and patterned fabrics.

List of Practical

Sr. No	Description	Unit No	Hrs.
1	Identification of different textile materials (natural & synthetic).	1	1
2	Classification and collection of fabric samples (woven, knitted, non-woven, etc.)	1	1
3	Burn test to identify natural vs. synthetic fibers.	2	1
4	Demonstration of fiber manufacturing process using models/videos.	2	1
5	Chart preparation: Classification of fibers with examples and uses.	2	1
6	Absorbency test for natural vs. synthetic fibers.	2	1
7	Feel & Appearance Test Touch and describe the feel, texture, and thickness of various fibers.	3	1
8	Identification and classification of different types of yarns.	3	1
9	Observation of yarn twist direction (S/Z twist).	3	1
10	Yarn strength Test (Manual)	3	1
11	Texture Observation: Touch and compare different yarns to understand soft, coarse, smooth, or textured yarns.	3	1
12	Sample collection: Different yarn textures and packages.	3	1
13	Weaving on a handloom or cardboard loom.	4	1
14	Identification of different fabric weaves (plain, twill, satin).	4	1

15	Knitting practice using basic knitting needles or looms.	4	1
16	Demonstration of non-woven fabrics (felt-making).	4	1
17	Sample collection and comparison: woven, knitted, non-woven, braided, lace.	4	1
18	Demonstration of basic finishes: calendaring, brushing, or mercerization.	5	1
19	Experiment: Water repellency or stain resistance on finished fabric.	5	1
20	Fabric Dyeing use natural dye and Resist dye	6	1
21	Use Different Tie and Dye Technique (any 5) sample create	6	2
22	Make a 2 sample of Batik Printing (Wax Resist)	6	2
23	Make a 2 sample of Block Printing	6	2
24	Make a 2 sample of Stencil Printing	6	2
25	Make a 2 sample of Vegetable Printing	6	2
	Total	-	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

1. Textile Science by E.P.G. Gohl and L.D. Vilensky
2. Fundamentals of Textiles and Their Care by Susheela Dantyagi
3. Textiles: Fiber to Fabric by Bernard P. Corbman