Program Name	: Diploma in Dress Designing & Garment Manufacturing
Program Code	: DD
Semester	: Second
Course Title	: Fabric Science
Course Code	: 24205

1. RATIONALE:

It will help designers, merchandisers to choose appropriate fabric for their designs. Also, help them to enhance a fabric through dyeing, printing and finishing processes. It will also equip them to have quality checks on fabrics.

2. COMPETENCY:

The aim of this course is to help the student to attain the industry identified competency through various teaching learning methods.

- **Apply different types of value added fabrics for relevant end use.**

3. COURSE OUTCOMES (COs):

The students will be able to:

a. Select relevant woven fabrics.
b. Select relevant knitted and non-woven fabrics.
c. Determine relevant pre-treatments for given fabric.
d. Apply dyes to given fabrics.
e. Print fabrics.
f. Apply relevant finishes to fabrics.

4. TEACHING AND EXAMINATION SCHEME:

Teaching Scheme			Credit (L+T+P)	Examination Scheme												
				Paper Hrs.	Theory						Practical					
					ESE		PA		Total		ESE		PA		Total	
L	T	P			Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
3	--	2	5	3	70	28	30*	00	100	40	25@	10	25	10	50	20

(*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain UOs required for the attainment of the COs.

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** - Practical; **C** – Credit, **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE MAP (with sample COs, Learning Outcomes i.e. LOs and topics):

This course map illustrates an overview of the flow and linkages of the topics at various levels of outcomes (details in subsequent sections) to be attained by the student by the end of the course, in all domains of learning in terms of the industry/employer identified competency depicted at the centre of this map.
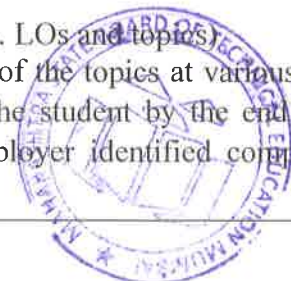
Figure 1 - Course Map

6. SUGGESTED PRACTICALS / EXERCISES:

The practicals /exercises in this section are psychomotor domain LOs (i.e. sub components of the Cos) are to be developed and assessed so the students can attain the competency.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1.	Identify the collected woven, knitted and non-woven samples (minimum 5 under each category)	I & II	2
2.	Analyse different woven sample: Based on design / draft (Peg plan), thread count, weave structure and their uses. (One sample under each type of weave)	I & II	2
3.	Analyse different woven sample: Based on design / draft (Peg plan), thread count, weave structure and their uses. (One sample under each type of weave)	I & II	

4.	Analyse different knitted samples based on its construction and uses.	II	2
5.	Create basic weave and its variation on per / loom / table loom. Plain weave.	I	2
6.	Draw a flow chart with clear indication of name of process, sequence and purpose for pre treatment of grey fabric.	III	2
7.	Dye given woven fabric using direct dyes	IV	2
8.	Dye given knitted fabric using direct dyes	IV	2
9.	Dye given knitted and woven fabric using reactive dyes	IV	2
10.	Dye given silk fabric using acid dyes	IV	2
11.	Dye given cotton fabric using natural dyes	IV	2
12.	Dye given silk fabric using natiral dyes	IV	2
13.	Collect block and screen printed fabrics	V	2
14.	Collect, identify and record printed fabrics to make a source file	V	2
15.	Collect, identify and record Indian traditional printed and woven fabrics to make a source file.	VI	2
16.	Collect, identify and record fabrics with individual or combination of basic finished or washes.	VI	2
	Total :		**32**

Note

i. A suggestive list of PrOs is given in the above table. More such PrOs can be added to attain the COs and competency. A judicial mix of minimum 24 or more practical need to be performed, out of which, the practicals marked as '*' are compulsory, so that the student reaches the 'Application Level' of Bloom's Taxonomy' as generally required by the industry.

ii. The 'Process' and 'Product' related skills associated with each PrO are to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1	Woven Fabric Formation.	20
2	Knitted fabric and non woven fabric.	20
3	Inspection of Grey fabrics.	10
4	Dyeing.	30
5	Printing.	10
6	Finishes.	10
	Total :	**100**

The above PrOs also comprise of the following social skills/attitudes which are Affective Domain Outcomes (ADOs) that are best developed through the laboratory/field based experiences:

a. Follow safety practices.
b. Practice good housekeeping.
c. Demonstrate working as a leader/a team member.
d. Maintain tools and equipments.
e. Follow ethical Practices.

The ADOs are not specific to any one PrO, but are embedded in many PrOs. Hence, the acquisition of the ADOs takes place gradually in the student when s/he undertakes a series of practical experiences over a period of time. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned

below:
- 'Valuing Level' in 1st year
- 'Organizing Level' in 2nd year
- 'Characterizing Level' in 3rd year.

7. MAJOR EQUIPMENT / INSTRUMENTS REQUIRED:

The major equipment with broad specification mentioned here will usher in uniformity conduct of experiments, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO. No.
1.	Swatch books	1, 2, 5 & 7
2.	Pick glass.	2
3.	Different types of Fabrics, Cellulose, protein and synthetic	6
4.	Frame / Paddle, table looms	3
5.	Chart papers of different colours and cutter.	3
6.	Gas stove, hot plate	6
7.	Beeker, measuring cylinder, table spoons, weighing scale, steel vessels for dyeing, etc	6

8. UNDERPINNING THEORY COMPONENTS:

The following topics / subtopics should be taught and assessed in order to develop Los in cognitive domain for achieving the Cos to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I **Woven Fabric Formation.**	1a. Explain the fabrication method. 1b. Describe step by step processes and sequences in weaving, prepatory process and loom parts and their functions. 1c. Explain the types of weaves and their relations to fabric properties. 1d. Explain the variations of fabrics with their specific uses.	1.1 Fabrics made from fibres, yarns and non – fibrous materials – properties and uses. 1.2 Weaving – introduction, loom – parts, mechanism and types, types of drafts. 1.3 Elementary weaves – plain, twill and satin its derivatives, properties and uses. 1.4 Complex weaves : Huck – a – back, honey comb, mock leno, bed ford cord, bique, extra warp and weft, colour and weave effects, their properties and use. Recent advances in weaving.
Unit– II **Knitted fabric and non-woven fabric.**	2a. Identify various knitted fabrics and mention their uses. 2b. Define various terms used for knitting. 2c. Difference between woven and knitted fabrics.	2.1 Knitting – introduction, loom 2.2 Study of important terms – Course, wales, texture, Gauge, calculation of GSM, Cover factor 2.3 Types of knitting – Warp and

	2d. Identify / Explain methods & application of non-woven fabrics.	Weft, single jersey, double jersey, purl and rib structure. 2.4 Comparison between weaving and knitting. 2.5 Methods & application of non-woven fabrics.
Unit– III Pre-treatments of Grey fabrics.	3a State the requirement of various pre-treatments on grey fabrics. 3b State purpose of singeing 3c State purpose of de-sizing 3d State purpose of scouring 3e State purpose of bleaching 3f State purpose of mercerising	3.1 Requirements of various pre Treatments 3.2 Singeing, 3.3 De-sizing, 3.4 scouring, 3.5 bleaching and mercerising.
Unit– IV Dyeing.	4a. Classify colouring method based on their origin. 4b. Explain parameters to be kept in mind for successful colouring to various fabrics. 4c. Explain dye application method on cellulosic, protein and synthetic fabrics	4.1 Introduction to dyeing, principles of dyeing and methods of dyeing (dope, fiber, yarn, fabric and garment) 4.2 Application of dyes on various fibers fabrics. Synthetic Dyes: Direct, wet, sulphur, reactive, acid and disperse.
Unit– V Printing.	5a. Explain methods of printing. 5b. Explain styles of printing. 5c. List methods used for fixation of printing.	5.1 Introduction to printing. 5.2 Style of printing 5.3 Method of printing 5.4 fixation of printing.
Unit– VI Finishes.	6a. List various mechanical and chemical finishes given to fabrics. 6b. State the purpose of each finishes.	6.1 Introduction to chemical, wash and wear, water repellent, soft finish flame retardant. 6.2 Mechanical; brushing, Calendering, Sanforising, decatizing.

Note: To attain the COs and competency, above listed UOs need to be undertaken to achieve the 'Application Level' and above of Bloom's 'Cognitive Domain Taxonomy'

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Woven Fabric Formation.	10	4	4	6	14
II	Knitted fabric and non-woven fabric	10	4	6		10
III	Pre treatment of Grey fabrics.	10	2	4	6	12
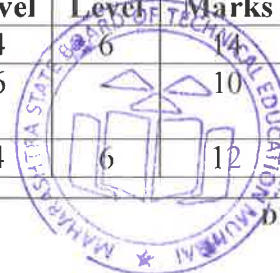
IV	Dyeing.	20	2	4	6	12
V	Printing.	20	2	4	6	12
VI	Finishes.	10	2	2	6	10
	Total	**80**	**16**	**24**	**30**	**70**

Legends: *R=Remember, U=Understand, A=Apply and above (Bloom's Revised taxonomy)*
Note: *This specification table provides general guidelines to assist student for their learning and to teachers to teach and assess with respect to attainment of LOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table.*

10. SUGGESSTED STUDENT ACTIVITES:

Other than the classroom and laboratory learning, following are the suggested student-related co-curricular activities which can be undertaken to accelerated the attainment of the various outcomes in this course :

a. Student will maintain a separate Journal for written practicals.
b. Students will visit textile mills, handlooms houses, weavers service centres as a field trip.
c. Students will prepare swatch book as a collection of fabrics along with specifications.
d. Students will practically learn application of different dyes for given fabrics in the textile laboratory.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES:

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a. Guide student(s) in sourcing and collecting of various fabrics for the swatch books..
b. Show video/animation films pertaining to the subject..
c. Demonstrate the use of pick glass and other equipment's.
d. Provide necessary equipment's for the practical's.

12. SUGGESTED LIST OF MICRO PROJECTS:

Students can go for market survey to local markets and wholescale market in the nearby cities.

a. Students should collect information regarding tie and dye fabrics.
b. Students should collect information regarding batik fabrics.
c. Students should collect information regarding block printed fabrics.
d. Students should collect information regarding screen and stencil printed fabrics.
e. Students should collect information regarding digital printed fabrics.

13. SUGGESTED LEARNING RESOURCES:

Sr. No.	Title of Book	Author	Publication & ISBN No.
1	"Elementary Idea of Textile Dyeing, Printing and Finishing"	Kanwar Varinder Pal Singh	Kalyani Publishers; Kalyani Publishers_454 edition (2009)
2	"Dyeing and Screen printing On Textiles"	Joanna Kinnersly-taylor	A&C Black Visual Arts; 2 edition (June 1, 2012) ISBN-87781408124758
3	"Techniques of Dyeing and Printing"	Hemalatha Jain	Ane Books Pvt. Ltd (2019)

		ISBN-9789380156170
4	"Technology of Textiles – Spinning and Weaving, Dyeing, Drying, Printing and Bleaching"	Eiri Board	Engineers India Research Institute (January 1, 2009) ISBN-9788186732489
5	"Dyeing and Printing: A handbook (Small-scale Textiles)"	Foulds, John (1989) Paperback Paperback – 1709	Practical Action (1709) ISBN-9781853390289
6	Modern Techniques Of Textile Dyeing, Bleaching And Finishing: 65th Publication On Small Scale Industries	Arora, S. M.	Delhi, Small Industry Research Institute, 1982-83
7	A Handbook Of Weaves	Oelsner, G. H. Dale, Samuel S.-Translator	New York, Dover Publications, Inc., 1952 ISBN-9780486231693
8	Block Printing On Textiles	Erickson, Janet	New York/London, Watson-Guptill Publications/Pitman Publishing, 1974 ISBN - 9780823005017
9	Understanding Fabrics A Practical Approach	Akshay Tholia	Sarv International Jaipur
10	Fabric Science	JJ Pizutto	ISBN - 9781609013806

14. SUGGESTED SOFTWARE / LEARNING WEBSITES:

  a) https://sewguide.com/fabric-weaving-types/
  b) https://sewguide.com/types-of-knit-fabric/
  c) https://www.sciencedirect.com/topics/chemistry/direct-dyeing
  d) https://en.wikipedia.org/wiki/Textile_printing
  e) http://textilefashionstudy.com/finishing-of-textiles-definitions-objectives-and-classifications/