GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)
Semester - II

Course Title: Textile Colour Science and Design
(Course Code: 4322803)

Diploma programme in which this course is offered	Semester in which offered
Textile Processing Technology	Second

1. RATIONALE

The diploma graduates are required to manage the wet processing of textiles in industry as per requirement of customers design. They need to identify the exact colour based on colour lightness, saturation and hue. This course has been included to provide the knowledge regarding basic colour science and designing in Textile wet Processing. It also provides the clear concept of matching for various shades of dyed and printed textiles. It is therefore very important course for textile processing engineers.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- **Prepare various kinds of colours for different textile designs using colour science.**
- **Prepare various kinds of designs for textile production.**

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

a) Develop desired colours using colour mixing laws
b) Design various patterns for textiles.
c) Create grade scale for various dyes.
d) Understand Textile Design and Software.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
1	0	4	3	00	00	25*	25	50

(*):For this practical only course, 25 marks under the practical CA has two components i.e. the assessment of micro-project, which will be done out of 10 marks and the remaining 15

marks are for the assessment of practical. This is designed to facilitate attainment of COs holistically, as there is no theory ESE.

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

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. T*hey are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'*.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Draw color wheel.	1	2
2	Draw light separation through prism	1	2
3	Prepare additive and subtractive colour mixing	1	4
4	Prepare two, three and four colours shirting design	1,2	4
5	Prepare two, three and four colours dress material design	1,2	4
6	Prepare two, three and four colours bed – sheet design	1,2	4
7	Prepare two and three colours military design	1,2	4
8	Prepare two, three and four colours saree palav design	1,2	4
9	Prepare two, three and four colours floral design	1,2	4
10	Create grade scale and colour depth range for various dye	1,2	4
11	Create printing pattern (harmony and contrast colour combination)	1,2	4
12	Draw different elements of textile design.	1,2	4
13	Draw different principles of textile design.	2	4
14	List out important tools of photoshop with their function.	2	2
15	List out important tools of coral draw with their function.	2	2
16	Perform market and internet survey for different textile designs for textile printing.	1,2	4
	Minimum Practical Hours	**56**	

Note

*i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*

*ii. The following are some **sample** 'Process' and 'Product' related skills(more may be added/deleted depending on the course)that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency..*

S.No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Prepare experimental set-up.	20
2	Operate the equipment setup.	20
3	Follow safe practices.	10
4	Record observations correctly.	20
5	Interpret the result and conclude.	30
Total		**100**

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

S. No.	Equipment Name with Broad Specifications	PrO.No.
1.	Engineering drawing instruments, brushes, colour box, drawing board, Computer with software, etc.	Almost all

7. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfil the development of this course competency.

a) Work as a leader/a team member.
b) Follow safety practices while using colour, instrument and computer.
c) Follow ethical practices.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i. 'Valuing Level' in 1st year
ii. 'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of Revised Bloom's taxonomy that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit – I Fundamental of Colour Science	1a. Describe colour andcolour perception 1b. Explain colour mixing laws and confusion in colour 1c. Describe colour vision theory 1d. Explain attributes & groups responsible for colour.	1.1 Perception of Colour (Light Source,Object and Observer) 1.2 Colour Mixing laws such as additive & subtractive colour mixing. 1.3 Colour vision Theory. 1.4 Colour attributes such as Hue, Chroma and Value. 1.5 Chromophore and auxochrome groups of dye molecules.
Unit– II Fundamental of Textile Design	2a. Describe textile design. 2b. Describe various textile designs. 2c. Understand basic of textile design software.	2.1 Concept of textile design. 2.2 Elements of textile design. 2.3 Principles of textile design. 2.4 Various textile designs such as floral, military, bed-sheet, curtain, etc. 2.5 Introduction to textile design software. (Photoshop, Coral draw)

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
1	**Fundamental of Colour Science**	**7**	—	—	—	—
2	**Fundamental of Textile Design**	**7**	—	—	—	—
	Total	**14**	—	—	—	—

Legends: *R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)*

10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course. Students should perform following activities in group and

prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Collect various designs for different textiles available in market.

b) Prepare shade matching for various colours and present in class room.

c) Visit nearby industries which prepare designs for textile materials.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

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

a) Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.
b) Guide student(s) in undertaking micro-projects.
c) ***'L' in section No. 4*** means different types of teaching methods that are to be employed by teachers to develop the outcomes.
d) About ***20% of the topics/sub-topics*** which are relatively simpler or descriptive in nature is to be given to the students for ***self-learning***, but to be assessed using different assessment methods.
e) With respect to ***section No.10***, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.
f) Guide students for finding various designs, safety guidelines and colour matching.

12. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro project should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

a) Develop different colours using colour mixing laws.

b) Prepare different saree palav designs on textile material using colours.

c) Prepare different military designs on textile material using colours.

d) Prepare different dress designs on textile material using colours.

e) Make shade card by preparing various depth of colour.

f) Collect designated textile materials and prepare sample book.

13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles	Gandhi, R.S. and H.A. Shah	Mahajan Book Distributor, Latest publication
2	Understanding Computer Colour Matching	Gangakhedkar, N.S.	Rutu Prakashan, Mumbai, Latest publication
3	Principle of Colour Technology	Billmeyer	Wiley
4	Textile Design (Text Book of Std-XI)	CBSE & NIFT	The Secretary, Central Board of Secondary Education, Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi-110092

14. SOFTWARE/LEARNING WEBSITES

i. http://textilefashionstudy.com
ii. http://textilelearner.blogspot.in
iii. http://www.nift.ac.in
iv. http://inifdsurat.com
v. Photoshop & Coral draw software

PO-COMPETENCY-CO MAPPING

Semester I	**Electronic Practice (Course Code: 4312001)**						
	POs						
Competency & Course Outcomes	**PO 1 Basic & Discipline specific knowledge**	**PO 2 Problem Analysis**	**PO 3 Design/ development of solutions**	**PO 4 Engineering Tools, Experimen-tation & Testing**	**PO 5 Engineering practices for society, sustainability & environment**	**PO 6 Project Management**	**PO 7 Life-long learning**
Competency	**Prepare various kinds of colours for different textile design using colour science.**						
Course Outcomes CO a) Develop desired colours using colour mixing laws.	3	1	1	3	-	1	2
CO b) Design various patterns for textiles.	3	2	3	2	-	1	2
CO c) Create grade scale for various dyes.	3	2	1	3	-	1	1
CO d) Understand textile design and software	3	2	2	3	-	1	2

*Legend: '**3**' for high, '**2**' for medium, '**1**' for low and '**-**' for no correlation of each CO with PO.*

16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

S. No.	Name and Designation	Institute	Contact No.	Email
1	Mr. R M Pandya	Dr. SSG, Surat	9428409925	ridpandya@gmail.com
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NITTTR Resource Person

S. No.	Name and Designation	Department	Contact No.	Email
1				
2				