



Maharashtra State Board of Technical Education, Mumbai

Teaching and Examination Scheme for Post S.S.C. Diploma Courses

Program Name : Diploma in Fashion & Cloting Technology

Program Code : DC

Duration of Program : 6 Semesters

With Effect From Academic Year: 2017 - 18

Semester : Third

Duration : 16 Weeks

S. N.	Course Title	Course Abbreviation	Course Code	Teaching Scheme			Credit (L+T+P)	Examination Scheme														Grand Total
				L	T	P		Theory						Practical								
								ESE		PA		Total		ESE		PA		Total				
								Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks			
1	Indian and World Costumes	IWC	22355	3	-	2	5	3	70	28	30*	00	100	40	25@	10	25	10	50	20	150	
2	Advanced Pattern Making	APM	22356	2	-	4	6	3	70	28	30*	00	100	40	50#	20	50	20	100	40	200	
3	Knitted and Non –Woven Fabric Technology	KNF	22357	3	-	2	5	3	70	28	30*	00	100	40	25@	10	25	10	50	20	150	
4	Textile Testing	TTE	22358	3	-	2	5	3	70	28	30*	00	100	40	25#	10	25	10	50	20	150	
5	Garment Component Manufacturing	GCM	22359	4	-	4	8	3	70	28	30*	00	100	40	50@	20	50	20	100	40	200	
6	Surface Ornamentation	SOR	22030	-	-	2	2	--	--	--	--	--	--	--	25@	10	25~	10	50	20	50	
Total				15	-	16	31	--	350	--	150	--	500	--	200	--	200	--	400	--	900	

Student Contact Hours Per Week: **31 Hrs.**

Medium of Instruction: **English**

Theory and practical periods of 60 minutes each.

Total Marks : **900**

Abbreviations: ESE- End Semester Exam, PA- Progressive Assessment, L - Lectures, T - Tutorial, P - Practical

@ Internal Assessment, # External Assessment, *# On Line Examination, ^ Computer Based Assessment

* Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment (5 marks each for Physics and Chemistry) 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 LOs required for the attainment of the COs.

~ For the courses having ONLY Practical Examination, the PA marks Practical Part - with 60% weightage and Micro-Project Part with 40% weightage

➤ **If Candidate not securing minimum marks for passing in the “PA” part of practical of any course of any semester then the candidate shall be declared as “Detained” for that semester.**



Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Third
Course Title : Indian and World Costumes
Course Code : 22355

1. RATIONALE

This course aims at building a foundation for the further courses related to fashion and clothing technology and other allied courses in coming semesters. Fashion and Clothing Technology students should have thorough knowledge of Indian and Western historical costumes and accessories according to religion, climate, ethical values, social life-style and prosperity. This course will help student to distinguish traditional costumes and relate them to the customs and life style of different countries of the world. The course focuses on developing imagination which enables students to use this attire as source of inspiration to develop contemporary fashion.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Design contemporary fashion based on Indian and World costumes from past fashion to future fashion.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- Modify fashions of western countries from different time periods to create contemporary garments.
- Create styles inspired from the eastern costumes for given design requirement.
- Use elements, styles and accessories pertaining to various states of India.
- Create designs for costumes of specified regions of India.
- Interpret current fashion trends and recommend styles for future fashion.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme			Credit (L+T+P)	Examination Scheme												
L	T	P		Theory						Practical						
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total	
					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 Practical; P- Practical; C- Credit, ESE - End Semester Examination; PA - Progressive Assessment



5. **COURSE MAP** ((with sample COs, PrOs, UOs, ADOs 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.

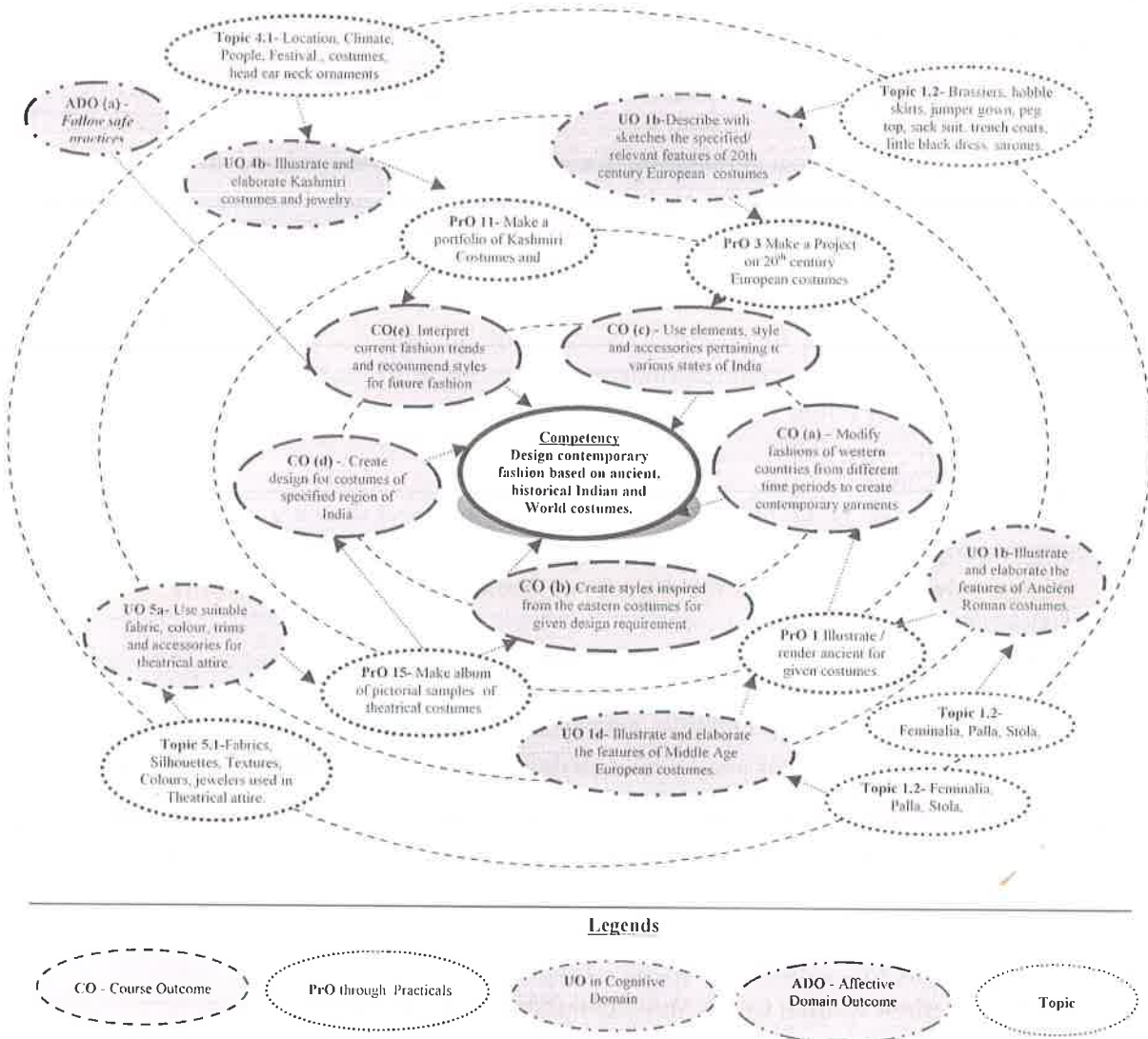


Figure 1 - Course Map

6. **SUGGESTED PRACTICALS/ EXERCISES**

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Illustrate and Render 18 th century European costumes: 2 Male costumes and 2 Female costumes.	I	02*
2	Illustrate and Render 19 th century European costumes: 2 Male costumes and 2 Female costumes.	I	02
3	Make a Project on 20 th century European costumes: 2 Male costumes and 2 Female costumes.	I	02

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
4	Illustrate and Render 18 th century American costumes: 2 Male costumes and 2Female costumes.	I	02
5	Illustrate and Render 19 th century American costumes: 2 Male costumes and 2Female costumes.	I	02
6	Illustrate and Render 20 th century American costumes: 2 Male costumes and 2Female costumes.	I	02
7	Illustrate and Render Japanese costumes: 2 Male costumes and 2Female costumes.	II	02*
8	Illustrate and Render Indonesian costumes: 2 Male costumes and 2Female costumes.	II	02
9	Illustrate and Render Kashmiri Costumes and Jewelry-2 Male costumes and 2Female costumes.	III	02*
10	Illustrate and Render Punjabi Costumes and Jewelry-2 Male costumes and 2Female costumes.	III	02
11	Illustrate and Render Rajasthani Costumes and Jewelry-2 Male costumes and 2Female costumes.	III	02
12	Illustrate and Render Gujarati Costumes and Jewelry-2 Male costumes and 2Female costumes.	IV	02*
13	Illustrate and Render Maharashtrian Costumes and Jewelry-2 Male costumes and 2Female costumes.	IV	02
14	Illustrate and Render Karnataka Costumes and Jewelry-2 Male costumes and 2Female costumes.	IV	02
15	Illustrate and Render Current Fashion Trends-2 Male costumes and 2Female costumes.	V	02*
16	Design a collection based on Fashion Forecasting	V	02
	Total		32

Note

- A suggestive list of PrOs is given in the above table. More such PrOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical need to be performed, out of which, the practicals marked as '*' are compulsory, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.
- The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1	Selection of relevant art material.	10
2	Use of relevant rendering technique.	20
3	Illustration/draping skills.	30
4	Variety in presentation of output.	30
5	Submit report in time.	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. Practice energy conservation.
- d. Demonstrate working as a leader/a team member.
- e. Maintain tools and equipment.
- f. 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
- 'Organising Level' in 2nd year
- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO. S.No.
1	Pencil: HB, 2B, 4B	1 to 8
2	Drawing sheets	1 to 8
3	Poster and water colours	1 to 8
4	Brush: Flat (1,3,6,8), Round (0,2,4,6)	1 to 8
5	Fabric: Linen, Silk, Cotton, Sarees, Dhoti, etc.	9 to 15
6	Display board: 4 ft x 4 ft	9 to 15
7	Computers with internet connectivity	16

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Western costumes- Europe and America	1a. Describe with sketches the specified/ relevant features of 18 th and 19 th century European costumes. 1b. Describe with sketches the specified/ relevant features of 20 th century European costumes. 1c. Describe with sketches the specified/ relevant features of 18 th , 19 th and 20 th century American costumes.	1.1 Earlier European costumes: a. Overview of 18 th century European costumes- Chinoiserie, Coats and capes, Corsets, Engageantes, Knee Breeches, Panniers, Polonaise Styles, Robes, Sack Gowns, Trousers. b. Changes in 19th century European costumes due to Industrial Revolution- Bathing Costumes, Betsy, Bloomers, Coats, Crinoline, Ditto Suits, The Dandy Dress 1.2 20th century costumes in Europe- 1900-2000.- Brassiers, hobble skirts, jumper

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	1d. Compare specified features of the given costumes of the given region.	gown, peg top, sack suit, trench coats, little black dress, sarongs, military uniforms and civilian dress, zoot suit, a-line skirt, bell bottoms, cat suit, Gaucho pants, hot pants, peasant look, mini skirt, halter tops, velour, baggy jeans, Goth style, sweatshirt, wonder bra. 1.3 Earlier American costumes: a. American Revolution in 18 th century b. Native American costumes in 19 th century- western dress, Blankets, Breechclout, Cloaks, Leggings, Skirt 1.4 20th century- American influence on world costumes- 1900-2000
Unit– II Far Eastern Costumes - Japan and Indonesia	2a. Describe with sketches the specified traditional costumes of the given country 2b. Describe with sketches the specified traditional make up styles and accessories of the given country.	2.1 Japanese costume: Traditional costumes of Japan- Kimono, Kosode, Furisode, Hirosode, Hakama, OBI – Sash, Geisha 2.2 Make up, Hairstyles and Body decoration, Accessories and Footwear- Geta, Tabis, Zori 2.3 Indonesian costume: National costumes- Batik, Kebaya, Peci 2.4 Indonesian Regional costumes- Baju Koko, Beskap, Baju Kurung, Baju Bodo, Headgears and Accessories
Unit – III Indian costumes- Northern Region	3a. Describe with sketches specified costumes, accessories and ornaments of Jammu and Kashmir. 3b. Describe with sketches specified costumes, accessories and ornaments of Punjab. 3c. Describe with sketches specified costumes, accessories and ornaments of Rajasthan. 3d. Compare specified costumes of north India	Indian costumes-Northern Region 3.1 Jammu and Kashmir a. Costumes: Peharan, Salwar, Pattu, Skull Cap, Khaji. Costumes of Dogra, Zachaldara, Kharboo, Tribal villages. b. Accessories and Ornaments. 3.2 Punjab a. Costumes: Tehmed, Kurta, Pyjama, salwar, Kameeze, Orhani, Churidar, Ghagra, Dupatta, Turban, Khes. b. Accessories and Ornaments 3.3 Rajasthan Costumes: Dhoti, Bandiya, Angarakha, Potia, Jodhapur Breeches, Achkan, Pichranga Pagdi, Kamberbandh, Khes, Turban. Accessories and Ornaments
Unit– IV Indian costumes- Southern	4a. Describe with sketches specified relevant costumes, accessories and ornaments of Gujarat.	Indian costumes-Southern and Western Regions 4.1 Gujarat a. Costumes: Kanchali, Chorno, Angarkha,



Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
and Western Regions	4b. Describe with sketches costumes, accessories and ornaments of the specified state. 4c. Compare with sketches costumes, accessories and ornaments of the specified regions. 4d. Compare costumes of specified regions	Ghagra, Pheto, Safo , Different types of Sarees and Textiles. b. Accessories and Ornaments. 4.2 Maharashtra a. Costumes: Dhoti, Sadra, Pheta, Uparni, Barabandi, Coat, Pagdi, Choli, Golnesana, Sakachcha-Nesana b. Draping style - Golnesana, Sakachcha-Nesana Dhoti, Pheta, Uparna, Accessories and Ornaments. 4.3 Karnataka a. Costumes: Dhotara, Shalya, Turban, Kuppasa, Saree draping – Coorg saree. b. Accessories and Ornaments.
Unit– V Present and Future Fashion	5a. Identify factors affecting fashion trends in the given situation 5b. Prepare survey report of specified Fashion Trends. 5c. Predict fashion using fashion forecast data for given situation. 5d. Suggest costumes for given situation based on forecast.	5.1 Factors affecting fashion trends 5.2 Current trends in western and Indian costumes 5.3 Forecast and Design for future fashion 5.4 Costumes selection for different situation

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	Western Costumes- Europe and America	8	2	4	6	12
II	Far Eastern Costumes- Japan and Indonesia	8	2	4	6	12
III	Indian Costumes- Northern Region	12	2	5	7	14
IV	Indian Costumes- Southern and Western Regions	12	4	6	8	18
V	Present and Future Fashion	8	1	5	8	14
Total		48	16	24	40	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 students with respect to attainment of UOs. The actual

distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table.

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 conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Maintain a scrapbook containing images of ancient costumes.
- b. Various draping techniques used in different countries.
- c. Watch historical movie clips for three-dimensional impact of historical costumes.

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. Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b. '**L**' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- c. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for **self-directed learning** and assess the development of the COs through classroom presentations (see implementation guideline for details).
- d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- e. Guide student(s) in undertaking micro-projects.
- f. Use of samples of costumes and accessories.
- g. Arrange visits to museums and art galleries to understand historical costumes.
- h. Guide student(s) in understanding the fashion and garment terminologies by showing the photographs

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. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- a. **Classification of garments:** Each student of the batch will classify the garment based on different wearing styles such as Indian costumes and Western costumes of a particular period.
- b. **Market Survey:** Every student will associate current trends in garments and accessories with periodic costumes and accessories.
- c. **Picture Collection / Illustration:** Each student will collect pictures of costumes from various parts and periods of India.
- d. **Redesigning:** Each student will redesigning for a period movie, such as Jodha Akbar, Bajirao Mastani, etc.
- e. **Window display:** Developing a collection based on any historical era and organizing a fashion show towards the end of the semester.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1.	Fashion from Ancient Egypt to the present day	Mila Contini	West Duxbury; Manchester ISBN No. 9780517099872
2.	History of Fashion in 20th Century	Gertrud Lehnert	West Duxbury; Manchester ISBN No. 9783829020336
3.	Fashion, Costume and Culture: Clothing, Headwear, Body Decorations and Footwear through the ages.	Sara Pendergast and Tom Pendergast, Sarah Hermsen – Project Editor	Thomson Gale ISBN: 9780787654214
4	History of 20th Century Fashion	Elizabeth Ewing	Quite Specific Media Group Ltd; ISBN: 9780896762381
5	Ancient Indian Costume	Alkazi, Roshen	South Asia Books ISBN: 9780836413342
6	Costumes and textiles of royal India	Kumar, Ritu	Christie's, ISBN: 9780903432559

14. SUGGESTED SOFTWARE/ LEARNING WEBSITES

- a. Ancient Costume Accessory ideas Roman and Greek accessories.
<https://www.youtube.com/watch?v=J31eENrUreU>
- b. How to Wear a Toga the Ancient Roman Way.
https://www.youtube.com/watch?v=BQYloC'_QcWY
- c. Ancient Greek Fashion.
https://www.youtube.com/watch?v=AjV2TT_tj_c
- d. Changing fashion of Indian women.
<https://www.youtube.com/watch?v=3ncmFyc7O6A>
- e. Indus Valley Civilization.
<https://www.youtube.com/watch?v=n7ndRwqJYDM>



Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Third
Course Title : Advanced Pattern Making
Course Code : 22356

1. RATIONALE

Pattern making is the heart of garment industry. The student should be able to develop pattern by following relevant process. Knowledge on human figure types and creation of pattern for customers plays vital role in fashion industry. Skills in pattern making by manipulating the basic pattern are to be developed in students through this course. Student should be able to apply the technique of draping and grading. Students should develop commercial pattern from the basic pattern.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Create different advance patterns using draping & drafting methods.**

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- Manipulate given patterns using principle of dart manipulation and contouring.
- Develop paper patterns for kids, men and women.
- Interpret the given human figures for proper apparel selection.
- Apply draping principles to develop patterns for different figures.
- Use grading techniques to develop different pattern sizes.

4. TEACHING AND EXAMINATION SCHEME

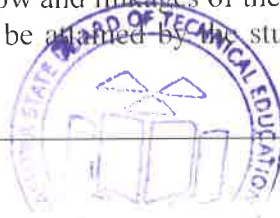
Teaching Scheme			Credit (L+T+P)	Examination Scheme												
L	T	P		Theory						Practical						
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total	
					Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
2	-	4	6	3	70	28	30*	00	100	40	50#	20	50	20	100	40

(): 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, PrOs, UOs, ADOs 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.

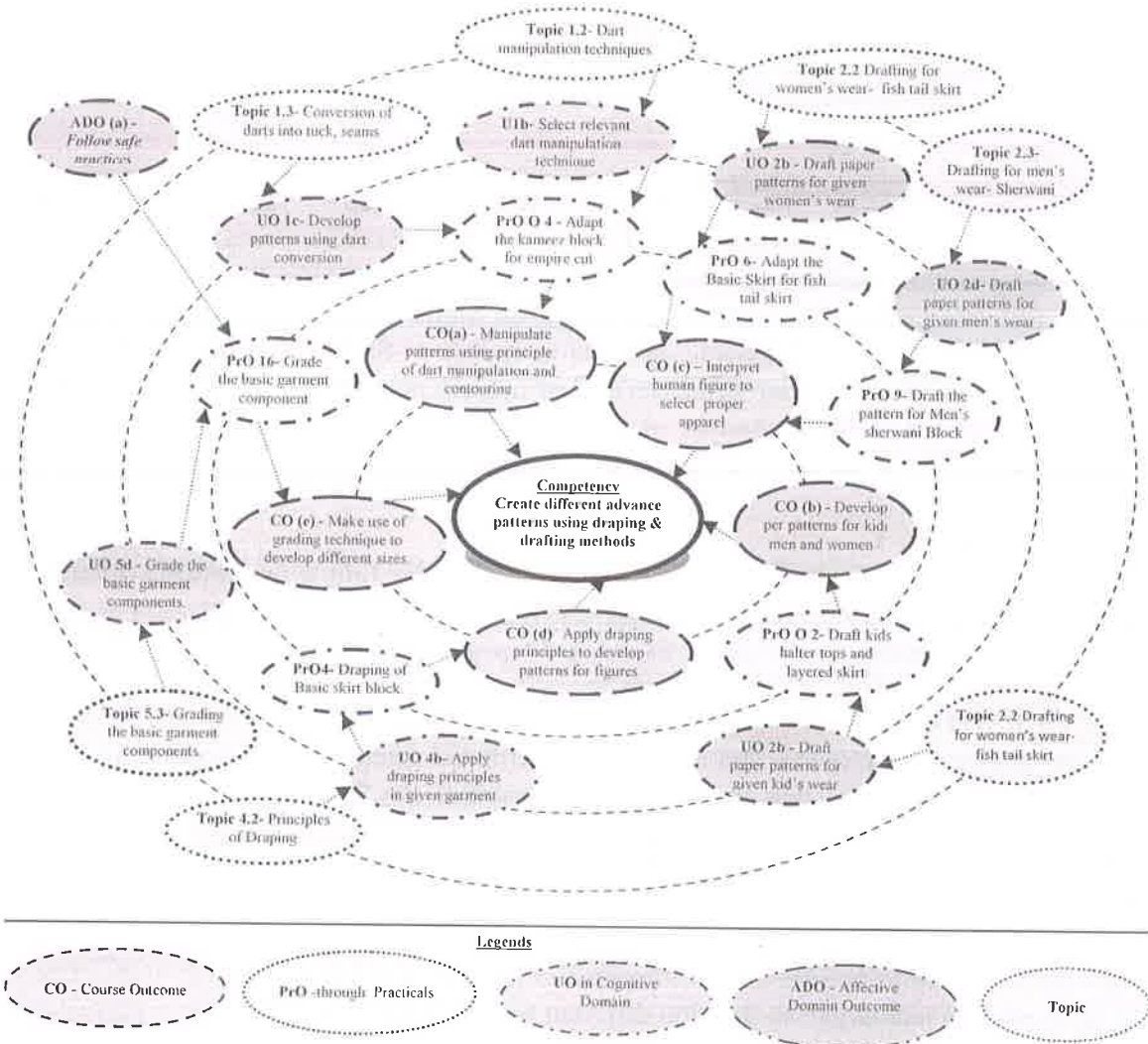
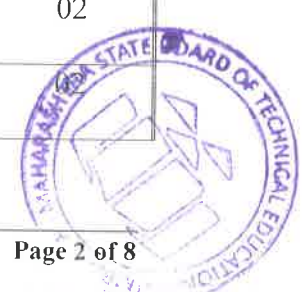


Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Draft Children's Romper (1/4th Scale) for specified dummy measurement. Part -I	II	02*
2	Draft Children's Romper (1/4th Scale) for specified dummy measurement. Part -II	II	02
3	Draft kids halter tops and layered skirt (1/4th Scale) for specified dummy measurement. Part -I	II	02
4	Draft kids halter tops and layered skirt (1/4th Scale) for specified dummy measurement. Part -II	II	02
5	Draft of women's jump suit.(1/4th Scale) for specified dummy measurement. Part -I	II	



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
6	Draft of women's jump suit.(1/4th Scale) for specified dummy measurement. Part -II	II	02
7	Adapt the given kameez block for empire cut dress (1/4thScale) for specified dummy measurement. Part -I	II	02
8	Adapt the given kameez block for empire cut dress (1/4thScale) for specified dummy measurement. Part -II	II	02
9	Draft a woman's corset with princess line (1/4th Scale) for specified dummy measurement. Part -I	II	02
10	Draft a woman's corset with princess line (1/4th Scale) for specified dummy measurement. Part -II	II	02
11	Adapt the given Basic Skirt for fish tail skirt (1/4th Scale) . Part -I	III	02*
12	Adapt the given Basic Skirt for fish tail skirt (1/4th Scale) . Part -II	III	02
13	Draft the pattern for Men's Formal Shirt and Sleeve (1/4th Scale) for specified dummy measurement . Part -I	III	02
14	Draft the pattern for Men's Formal Shirt and Sleeve (1/4th Scale) for specified dummy measurement . Part -II	III	02
15	Draft the pattern for Men's jeans Block (1/4th Scale) for specified dummy measurement . Part -I	III	02
16	Draft the pattern for Men's jeans Block (1/4th Scale) for specified dummy measurement . Part -II	III	02
17	Draft the pattern for Men's sherwani Block (1/4th Scale) for specified dummy measurement . Part -I	III	02
18	Draft the pattern for Men's sherwani Block (1/4th Scale) for specified dummy measurement . Part -II	III	02
19	Adapt the men's S.B.coat or D.B.coat (1/4th Scale) for specified dummy measurement . Part -I	III	02
20	Adapt the men's S.B.coat or D.B.coat (1/4th Scale) for specified dummy measurement . Part -II	III	02
21	Drafting men's tee shirt with raglan sleeve (1/4th Scale) for specified dummy measurement . Part -I	III	02
22	Drafting men's tee shirt with raglan sleeve (1/4th Scale) for specified dummy measurement . Part -II	III	02
23	Draping of Basic bodice block for specified dummy . Part -I	IV	02*
24	Draping of Basic bodice block for specified dummy . Part -II	IV	02
25	Draping of Basic sleeve and collar block for specified dummy. Part -I	IV	02
26	Draping of Basic sleeve and collar block for specified dummy. Part -II	IV	02
27	Draping of Basic skirt block for specified dummy. Part -I	IV	02
28	Draping of Basic skirt block for specified dummy. Part -II	IV	02
29	Draping of men's trouser block for specified dummy. Part -I	IV	02
30	Draping of men's trouser block for specified dummy. Part -II	IV	02
31	Grade the basic garment component for specified dummy. Part -I	V	02*
32	Grade the basic garment component for specified dummy. Part -II	V	02
	Total		64

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 judicious 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 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.
- ii. The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1	Use of measurement tools.	10
2	Follow the drafting principles correctly.	30
3	Use of pattern making tools properly.	20
4	Indicate the symbols and landmarks in pattern drafting.	10
5	Presentation of output.	10
7	Answer to sample questions	10
8	Submit report in time	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:

- Follow safety practices.
- Practice good housekeeping.
- Practice energy conservation.
- Demonstrate working as a leader/a team member.
- Maintain tools and equipment.
- 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:

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- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in 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	Standard dummies	12 to 16
2	Measuring tools-measuring tape, flexi tape	All
3	Stationary material such as pencil, eraser, scale	1 to 11
4	Brown sheet	1 to 11
5	Tracing paper-Gateway	1 to 11



S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO,No.
6	¼ scale, French curve	1 to 11
7	Fabric-muslin, grey cloth	23 to 30

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Dart Manipulation and Contouring	1a. Describe various types of darts used in the given patterns 1b. Select relevant dart manipulation technique for the given pattern 1c. Develop patterns for given style using dart conversion 1d. Interpret the given contouring guidelines.	1.1 Dart terminology, types of Darts 1.2 Dart manipulation techniques 1.3 Conversion of darts into tucks, seams (style lines), pleats and gathers 1.4 Contouring principle, and guidelines 1.5 Cows
Unit– II Pattern plot and manipulation for apparels	2a. Identify garments for kids, men, women for specified requirement 2b. Develop paper patterns for specified kids wear 2c. Develop paper patterns for given women's wear 2d. Develop paper patterns for given men's wear	2.1 Drafting for kids wear- Romper, layered skirt with halter top 2.2 Drafting for women's wear- off shoulder top, evening gown 2.3 own with corset and fish tail skirt 2.4 Drafting for men's wear- formal shirt, Sherwani, Jeans, S.B.coat
Unit– III Fitting Analysis	3a. Identify the fitting problems in given garment 3b. Make use of fitting principles to solve the given fitting problems. 3c. Classify the given human figure types 3d. Suggest relevant styles to a given human figure for proper garment selection	3.1 Fitting Principles 3.2 Fitting Analysis-Fitting problems associated with women's garments and their remedies 3.3 Fitting problems associated with men's garments and their remedies 3.4 Human figure types- Tall and thin, short and stout, Oval Figure, Rectangular figure, Triangular figure, Inverted Triangular Figure, hourglass figure.
Unit– IV Draping	4a. Identify the given tools for draping 4b. Make use of draping principles for a given garment 4c. Select relevant draping material for a given garment 4d. Apply draping procedure to develop given patterns	4.1 Draping Terminology 4.2 Tools used for Draping 4.3 dress form and its parts 4.4 Principles of Draping 4.5 Draping material- selection, preparation 4.6 Draping procedure for women's upper and lower garments.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit- V Grading	5a. Identify the principle of grading 5b. Apply principles of grading in given situation. 5c. Select method of grading for given garment 5d. Grade the given basic garment components	5.1 Principles for Grading 5.2 Methods of grading-Track and Nested 5.3 Grading the basic Garment Components

Note: To attain the COs and competency, above listed Learning Outcomes UOs need to be undertaken to achieve the 'Application Level' 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	Dart Manipulation and Contouring	08	04	06	08	18
II	Pattern plot and manipulation for apparels	08	04	04	10	18
III	Fitting Analysis	06	02	04	08	14
IV	Draping	04	02	02	06	10
V	Grading	06	04	02	04	10
Total		32	16	18	36	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 students with respect to attainment of UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table.

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 conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Student should maintain a notebook where all the new terminologies which are used in the pattern making and grading will be noted with meanings and sketches/ figures.
- Students should visit the garment manufacturing unit and observe the steps in pattern making of various garments. He will write observations and present a report.
- Student will visit at least three fashion boutiques to observe sample designs of the draping techniques. He will draw sketches of samples and report them to teacher.

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:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.

- b. '**L**' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- c. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for **self-directed learning** and assess the development of the COs through classroom presentations (see implementation guideline for details).
- d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- e. Guide student(s) in undertaking micro-projects.

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. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- a. **Classification of human figures:** Each student will classify at least 50 human figures from a lot of collected pictures based on different body types such as tall and thin, short and stout, oval, triangular, rectangular. They can use mobile phone cameras also to acquire pictures.
- b. **Fitting Analysis:** The teacher will assign one human figure and the students will analyze the figure and suggest proper apparel choice such as colour, style and print.
- c. **Dart conversion:** student will modify the patterns using conversion of darts into seams, pleats and tucks.
- d. **Picture Collection:** Collect pictures for different human figures.
- e. **Draping:** Students will develop patterns for their own garments by draping method
- f. **Contouring:** Students should apply contouring principle in pattern making for their friends/ relatives

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Zarapkar System of Cutting	Zarapkar K.R.	Sale Publishers, Bombay, 2014, ISBN: 9788124301999
2	Pattern Making for fashion Design	Helen Joseph Armstrong	Harper Collins, LA, 2009, ISBN No. 978-0060403324;
3	Metric Pattern Cutting for Women	Winifred Aldrich	Balckwell Science Ltd. London, ISBN No. 978-1405175678

4	Pattern Cutting Made Easy	Gillian Holman	Balckwell Science Ltd., London ISBN No. 9781849940733
5	More Dress Pattern Designing	Natalie Bray	Balckwell Science Ltd., London ISBN No. 9780632065028

14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. www.creativebug.com/classseries/single/dart-manipulation?https://www.fibertofashion.com
- b. isntthatsew.org/dart-manipulation/
- c. www.youtube.com/watch?v=VAttkI8MjkU
- d. www.clothingpatterns101.com/pattern-drafting.html
- e. www.slideshare.net/thyrine/dart-manupulation
- f. www.gradehouse.co.uk/what-is-pattern-grading/
- g. www.clothingpatterns101.com/pattern-grading.html
- h. www.designersnexus.com/fashion-design-industry-information/what-is-fashion-draping/
- i. style2designer.com/apparel/draping-mannequin/what-is-draping-technique-and-its-process/
- j. www.universityoffashion.com/disciplines/draping/



Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Third
Course Title : Knitted and Non-Woven Fabric Technology
Course Code : 22357

1. RATIONALE

Knitting is a very efficient and versatile method of making fabric. The loop structure contributes outstanding elasticity and favorable properties in fabric, which expand the range of end uses in garment manufacturing with stability more like that of woven. This course is developed to use the basic principles of warp, weft and flat knitting in fabric production for apparel manufacturing along with the knowledge of non-woven fabrics to resolve the industrial problems.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Develop fabrics using different techniques other than woven.

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- Use weft knitting principle to develop relevant knitted fabric.
- Select relevant knitted fabric by using physical properties of it.
- Test the quality parameters of knitted fabric.
- Use warp knitting principle to develop ornamented warp knitted fabric.
- Use nonwoven fabric to develop relevant garment.

4. TEACHING AND EXAMINATION SCHEME

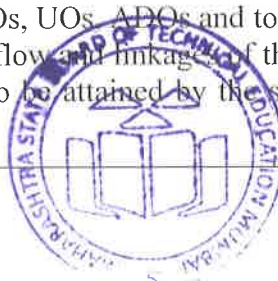
Teaching Scheme			Credit (L+T+P)	Examination Scheme												
L	T	P		Theory						Practical						
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total	
Max	Min	Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min		
3	-	2	5	3	70	28	30*	00	100	40	25@	10	25	10	50	20

(*): 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, PrOs, UOs, ADOs and topics)

This course map illustrates an overview of the flow and linkage 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.

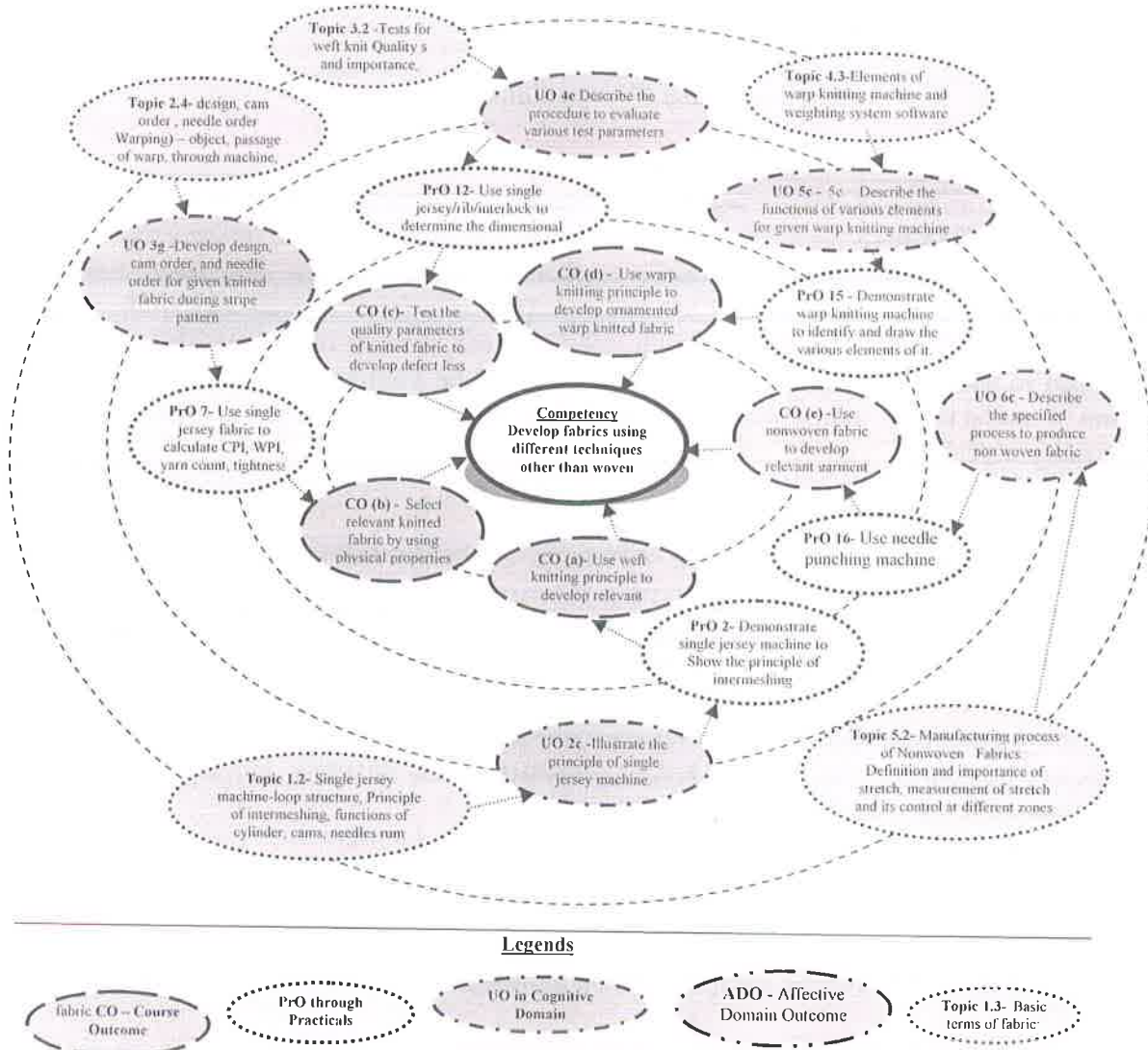


Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Use knitted fabric sample to identify and draw the basic terms like face loop, back loop, technical face, technical back, and Top and bottom side of it.	I	02*
2	Use similar GSM knitted fabric and woven fabric to evaluate a. Stretch, elastic recovery ,strength of fabric b. Identify and draw the intermeshing and interlacement of thread.	I	02
3	Demonstrate single jersey machine to	I	02*



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
	a. Show the principle of intermeshing b. Identify and draw various elements. c. Show the flow process of yarn.		
4	Demonstrate rib machine to a. Show the principle of intermeshing b. Identify and draw the process of yarn.	I	02
5	Use interlock knitting machine to set the needles, cylinder tricks and cylinder cams for given fabric.	I	02
6	Demonstrate flat knitting machine to show the process flow of material and identify-draw the various elements of it.	I	02
7	Use single jersey fabric to calculate CPI, WPI, yarn count, tightness factor, GSM and yarn count by analyzing the given fabric.	II	02*
8	Use striped single jersey fabric to calculate course wise colour repeat, Number of colored yarns, and decide the position of stripper.	II	02
9	Use Rib fabric to calculate CPI, WPI, yarn count, tightness factor, GSM and yarn count by analyzing the given fabric.	III	02*
10	Use interlock fabric to calculate CPI, WPI, yarn count, tightness factor, GSM and yarn count by analyzing the given fabric.	III	02
11	Use single jersey/rib and interlock fabric to analyze for finding design, representing the design on paper and estimate the needle order and cam order for the same.	IV	06
12	Use single jersey/rib/interlock to determine the dimensional stability in dry/wet condition.	III	02*
13	Determine the angle of spirality for given knitted fabric.	IV	02*
14	Use GSM cutter method and mathematical method to determine the GSM of given knitted fabric.	V	02*
15	Demonstrate warp knitting machine to identify and draw the various elements of it.	V	02
16	Demonstrate needle punching machine to show the process flow of material.	V	02
	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 judicious mix of minimum 12 or more practical need to be performed, out of which, the practicals marked as '*' are compulsory, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.
- ii. The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1	Demonstration of machine set up	20
2	Describe operation	20



3	Safety measures	10
4	Representation of machine and parts	10
5	Interpretation of result and Conclusion	20
6	Answer to sample questions	10
7	Submission of report in time	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. Practice energy conservation.
- d. Demonstrate working as a leader/a team member.
- e. Maintain tools and equipment.
- f. 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
- 'Organising Level' in 2nd year and
- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO. S. No.
1	Single jersey machine with 34 inch cylinder diameter	3
2	Rib machine with 30 inch cylinder diameter and 26E machine gauge	4
3	Interlock machine with 30 inch cylinder dia. And 26E machine gauge	5
4	10 inch knife GSM cutter	3 to 16
5	Counting glass, 30inch steel scale, weighing pan with min 1 gm to 100 gm weight range.	3 to 16
6	Flat knitting machine with 18E and V bed needle tricks arrangement	6
7	Warp knitting machine with single bar and pattern wheel	10

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.



Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Knitting process and Weft knitting machines	1a. Describe with sketches the fabric manufacturing method to produce given type of fabric. 1b. Describe with sketches the principle of intermeshing of loops for given yarn. 1c. Distinguish the features between the given type of fabrics. 1d. Draw the loop structure of the given knitted fabric. 1e. Identify class of the given weft knitting machine with justification. 1f. Describe with sketches the procedure develop the specified fabric by using relevant technique.	1.1 Various ways of fabric manufacture 1.2 Principle of intermeshing of loops. 1.3 Basic terms of fabric: Course, Wales, Stitch Length, Needle Loop, shinker loop, Face Loop, Back loop, Course Length. 1.4 Classification: knitting 1.5 knitted and woven fabrics. 1.6 Classification of weft knitting machine. 1.7 Single jersey machine-loop structure, Principle of intermeshing, functions of cylinder, cams, needles, fabric spreader. features ,stripper 1.8 Rib machine:-structure, principle of intermeshing, arrangement of needles and tricks. Cylinder /dial cam. features 1.9 Interlock machine: structure, principle, arrangement of needle and cylinder trick.cam arrangement. Features, Flat knitting:- passage, principle, procedure to develop the specified fabric by using V bed
Unit – II Weft knitted fabrics	2a. Identify the given type of knitted fabric with justification 2b. Describe with sketches the loop structure for the given type fabric. 2c. Develop with sketches design, cam order, and needle order for the given knitted fabric. 2d. Describe with sketches the ornamentation of the knitted fabric by using specified basic stitches. 2e. Describe with sketches the structure for given type of advanced fabric.	2.1 Classification of weft knitted fabrics Single jersey/rib/interlock/purl fabric-structure, properties, comparison between the single and double jersey , physical properties of the given fabric 2.2 Principle stitches: knit, tuck, miss, purl, Loop, diagram of tuck and float stitch, Effect of tuck and float stitch on fabric property. 2.3 Concept of design, cam order , needle order 2.4 Representation of fabric on paper, method of presentation, Illustrate relevant notation on paper for the given design of fabric, ornamentation of single, rib, interlock and purl fabrics: La-coste, cross tuck, satin, jersey blister, thick fleece, milano rib, double pique, pique poplin, evermote, punto - di -roma, ottoman rib, texi pique. 2.5 Advanced fabric: Fleecy fabric, plush, jacquard.



Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit– III Quality and production of knitted fabric	3a. Identify the fabric defect for the given knitted fabric in given situation. 3b. Describe with sketches the procedure to evaluate various test parameters for the given knitted fabric: angle of spriality, course length etc 3c. Calculate the knitted fabric production on given knitting machine. 3d. Describe with sketches the methodology to estimate the factors such as stitch length, GSM, tightness factor and of given fabric.	3.1 Weft knit fabric Defects: Causes and Remedies. 3.2 Tests for weft knit Quality: calculation of Spriality, barre , course length , GSM,CPI and WPI, stitch length , yarn count, stretch memory. 3.3 Knitting machine production: 3.4 Fabric parameter: Stitch length, tightness factor, GSM calculation , density of fabric.
Unit– IV Warp knitting machines and fabrics	4a. Describe with sketches the loop structure for given warp knitted fabric. 4b. Describe with sketches the functions of various elements for the given type of warp knitting machine. 4c. Evaluate the lapping movement diagram for knitted fabric from given chain notation. 4d. Describe with sketches the specified application of warp knitted fabric.	4.1 Warp knitting – General, Loop structure of warp knit fabric, 4.2 Compression between warp and weft knitting. 4.3 Elements of warp knitting machine – needle bar, sinker bar, presser bar, latch wire, pattern drum, pattern wheel, and chain links, lapping movement. 4.4 Warp knitting - Fabric structure, representation of fabric, chain notation, Single bar, two bar fabrics 4.5 Applications of warp knit fabrics
Unit V Non-woven	5a. Describe with sketches the concept of specified non-woven fabric. 5b. Identify the class of the given non -woven fabric with justification. 5c. Describe with sketches the specified process to produce non-woven fabric. 5d. Describe properties of non-woven fabric for the specified application.	5.1 Non woven: Concept, Classification, favorable Properties for Garment Productions. 5.2 Manufacturing process of Nonwoven Fabrics. 5.3 Dry Method, Bonding method and Needle Bonding methods of production, 5.4 Properties and uses.

Note: To attain the COs and competency, above listed Learning Outcomes UOs need to be undertaken to achieve the 'Application Level' 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	Basics of knitting process	04	02	02	-	04
II	Weft knitting machines	12	02	08	08	18
III	Weft knitted fabrics	12	02	04	08	14
IV	Quality and production of knitted fabric	06	02	02	06	10
V	Warp knitting machines and fabrics	08	04	04	08	16
VI	Non woven	06	02	02	04	08
Total		48	14	22	34	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 students with respect to attainment of UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table.

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 conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Prepare journals based on practical performed in workshop.
- Handle miniature knitting machine to understand intermeshing principle.
- Give seminar on any relevant topic.
- Library survey regarding use of single jersey/rib/interlock fabric in knitted garment industry.
- Prepare power point presentation or animation for showing different types of weft knitting and warp knitting machine.

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:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- 'L' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the LOs/COs through classroom presentations (see implementation guideline for details).
- With respect to item No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- Guide student(s) in undertaking micro-projects.



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. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- Basics of knitting process:** Prepare demo model of stitch by using metal wire of different colors for representing basic terminology of knitted fabric basic terms.
- Basics of knitting process:** Prepare comparative chart for comparing woven structure and knitted fabric structure.
- Weft knitting machines:** Collect colored photographs of single jersey/rib/interlock machines basic elements and stick on card sheet by writing specific feature of relevant element.
- Weft knitted fabrics:** Prepare demo models of single jersey/rib/interlock/rib loop structure by using flexible colored wire to reflect difference in intermeshing principle among each other.
- Weft knitted fabrics:** Prepare booklet of showing various ornamented design and express cam order and relevant needle order for each designs.
- Quality and production of knitted fabric:** Prepare the informative table showing list, definition, photograph, causes and remedies of various knitted fabric defects.
- Warp knitting machines and fabrics:** Prepare booklet showing collection of warp knitting various elements photograph with specific function of the same.
- Warp knitting machines and fabrics:** Prepare card sheet of lapping movement diagram and chain notation of various ornamented designs for warp knitted fabric.
- Nonwoven:** Collect the different sample of various non woven fabrics and stick on card sheet by captioning the relevant technology used to produce the same over the sample.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1.	Knitting Technology	D.J. Spencer	Woodhead Publishing Limited, ISBN: 9781855733336
2.	Fundamentals and advances in knitting technology	Sadan Chandra Roy	Wood head publication India limited, New Delhi 2012 ISBN: 9789380308166
3.	The Nonwovens	Gianni Tanchis	ITMA April 2008 publication



14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. en.wikipedia.org/wiki/Knitting
- b. www.youtube.com/watch?v=3uw-nUvGrBY
- c. www.nptel.ac.in/courses/116102008/
- d. www.garmentsmerchandising.com/list-of-fabrics-used-in-knit-garments-manufacturing/
- e. www2.ca.uky.edu/HES/fcs/FACTSHTS/CT-MMB-165.pdf
- f. www.karlmayer.com/en/products/warp-knitting-machines/tricot-machines/tricot-machines-with-2-guide-bars/
- g. www.nptel.ac.in/courses/116102014/



Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Third
Course Title : Textile Testing
Course Code : 22358

1. RATIONALE

Ever-rising competition in fashion industry has given more importance to quality, waste reduction and cost effectiveness than ever before. Yarns being the base of fabrics, they need to be tested to ensure fabric quality. In this course basic concepts and principles of yarn and fabric testing are included. Yarn properties affect the fabric properties and therefore the end usability. Thus it will help students in selection of suitable fabric. Fabric testing will also help in quality assurance, cost cutting, waste reduction and customer satisfaction in garment production.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Apply principles of yarn and fabric testing in selection of raw materials and quality assurance in garment manufacturing.

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- Perform yarn testing.
- Evaluate given fabrics based on dimensional properties.
- Evaluate the given fabrics for handle and comfort properties.
- Rate the given fabrics based on tensile properties.
- Rate the given fabric based on fastness properties.
- Evaluate serviceability of given fabric for specified end use.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme			Credit (L+T+P)	Examination Scheme												
L	T	P		Theory						Practical						
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total	
Max	Min	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, PrOs, UOs, ADOs 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.

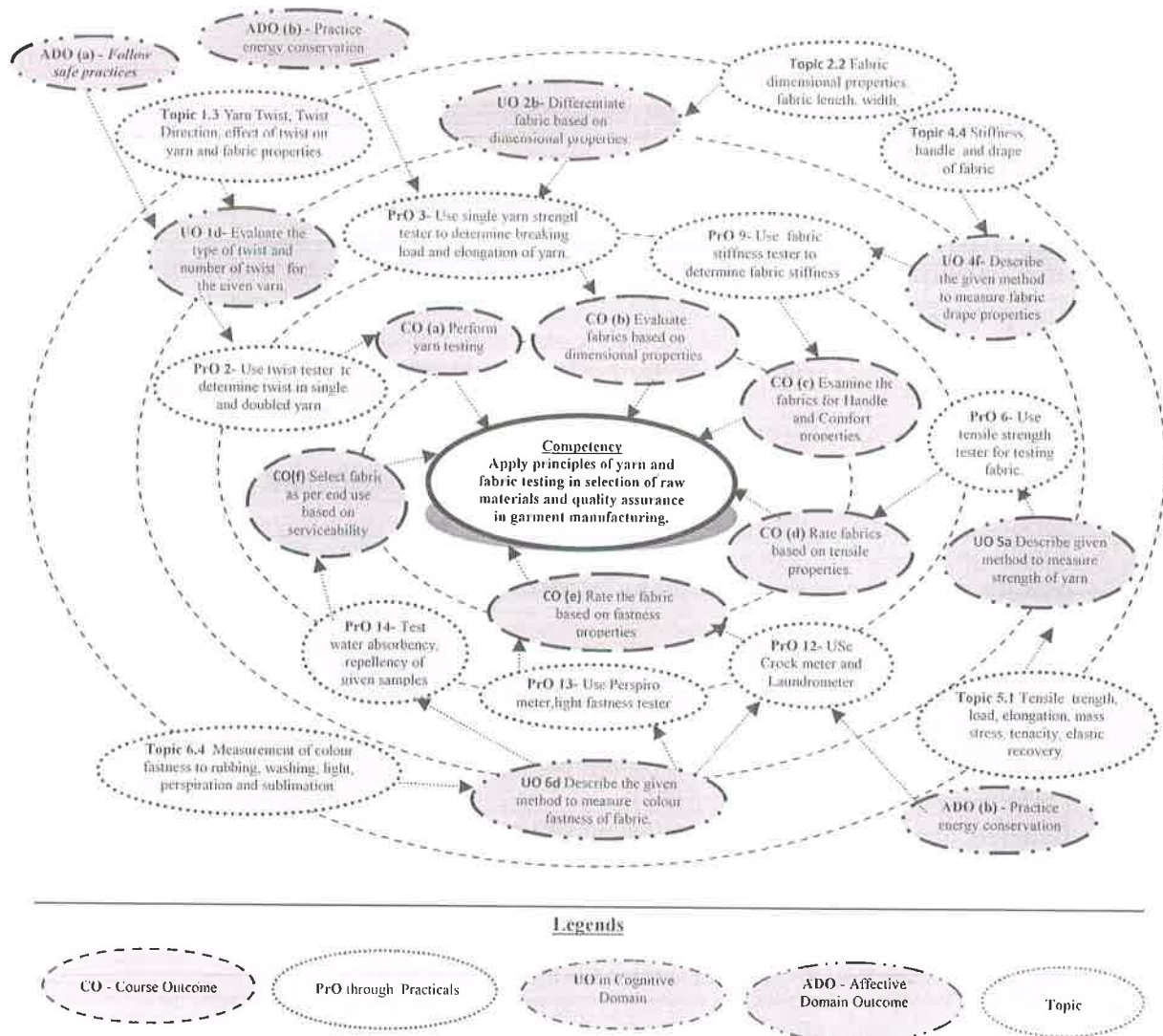


Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Use wrap reel to determine yarn count (Ne, Nm, Tex, Denier).	I	02*
2	Use twist tester to determine twist in single and doubled yarn..	I	02
3	Use single yarn strength tester to determine breaking load and elongation of yarn. Part I	II	02
4	Use single yarn strength tester to determine breaking load and elongation of yarn. Part II	II	02
5	Determine fabric dimensions (Thread count, threads per unit length,	III	02

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
	cover factor, fabric width, GSM, and Thickness.) Part I		
6	Determine fabric dimensions (Thread count, threads per unit length, cover factor, fabric width, GSM, and Thickness.) Part II	III	02
7	Determine shrinkage of fabric(Hot water and Hot Air)	III	02
8	Determine tensile strength of fabric by using tensile strength tester.	IV	02
9	Determine tear and bursting strength of fabric.	IV	02
10	Determine crease recovery angle by crease recovery tester.	IV	02
11	Determine fabric stiffness using fabric stiffness tester.	V	02
12	Determine drape of fabric by using drape meter.	V	02
13	Assessment of abrasion resistance and pilling propensity of fabric.	VI	02
14	Determine colour fastness to rubbing, washing.	VI	04
15	Determine colour fastness to perspiration and light.	VI	06
16	Test water absorbency, repellency of given samples	VI	02
	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 12 or more practical need to be performed, out of which, the practicals marked as '*' are compulsory, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.
- ii. The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
a.	Preparation of experimental set up	20
b.	Setting and operation	20
c.	Safety measures	10
d.	Observations and Recording	10
e.	Interpretation of result and Conclusion	20
f.	Answer to sample questions	10
g.	Submission of report in time	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 equipment.
- 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
- 'Organising Level' in 2nd year and
- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

S. No.	Equipment Name with Broad Specifications	PrO. S. No.
1	Electronic balance, with the scale range of 0.001g to 500g. Pan size 100 mm; response time 3-5 sec.; power requirement 90-250 V, 10 watt.	1,4,11.
2	Electric oven inner size 18''x18''x18''; temperature range 100 to 250 ^o C. with the capacity of 40lt, moisture tester.	5
3	British wrap reel	1
4	Metric wrap reel	1
5	Single yarn twist tester	2
6	Double yarn twist tester	2
7	Single Yarn Strength Tester	3
8	Thickness tester	4
9	Tensile strength tester	6
10	Bursting strength tester	7
11	Tearing strength tester	7
12	Crease recovery tester	8
13	Fabric stiffness tester	9
14	Drape meter	10
15	Abrasion resistance tester	11
16	Pilling tester	11
17	Crock meter, Laundro meter, Grey scales	12
18	Perspiro meter, Light Fastness tester, Grey scales	13
19	Spray tester	14
20	Hydro static head test	14

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added:

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Yarn Testing	1a. Describe with sketches the procedure for measuring specified yarn parameters. 1b. Select the relevant yarn numbering systems for the given yarn with justification. 1c. Describe with sketches the method of measurement of twist	1.1 Different systems of yarn numbering. (Direct, indirect): British count, Metric, Tex, Denier count. 1.2 Determination of yarn count by taking accurate length and accurate weight with electronic balance. 1.3 Yarn Twist, Twist Direction, effect

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	<p>in the given yarn.</p> <p>1d. Evaluate the type of twist and number of twist for the given yarn.</p> <p>1e. Justify the importance of yarn test parameter in relation to the property of the given fabric</p>	<p>of twist on yarn and fabric properties.</p> <p>1.4 Measurement of yarn twist by, i) Twist contraction principle ii) Twist and untwist principle</p> <p>1.5 Yarn evenness, types of variations in yarn (random and periodic), Expressions used for unevenness: U%, C.V. %, Imperfections, effect of yarn evenness on yarn and fabric properties.</p>
Unit– II Fabric sampling and Dimensional properties	<p>2a. Describe with sketches the fabric sampling method in the given situation.</p> <p>2b. Differentiate fabric based on dimensional properties used for the given applications.</p> <p>2c. Determine crimp, GSM and cover factor of the given sample.</p> <p>2d. Test shrinkage of the given fabric to select its suitability for garment manufacture.</p>	<p>2.1 Fabric Sampling method</p> <p>2.2 Fabric dimensional properties: fabric length, width, thickness, weight.</p> <p>2.3 Warp count, weft count, threads/unit length, cover factor, crimp in warp and weft</p> <p>2.4 Dimensional stability, measurement of dimensional stability of fabric</p>
Unit– III Fabric serviceability	<p>3a. Select the fabric for given end use based on abrasion test with justification.</p> <p>3b. Describe with sketches the the give method to correlate abrasion resistance of the fabric with wear performance.</p> <p>3c. Describe with sketches the the given method to Rate the given fabric for pilling resistance fabric.</p>	<p>3.1 Serviceability, wear and abrasion.</p> <p>3.2 Measurement of wear and abrasion using Abrasion tester.</p> <p>3.3 Pilling of fabric, factors responsible for pilling of fabric</p> <p>3.4 Measurement of pilling by ICI Pill box tester.</p>
Unit-IV Fabric Comfort and Handle properties	<p>4a. Measure the water fabric relation for a given fabric using relevant method</p> <p>4b. Describe with sketches the procedure to measure wetting of fabric based on contact angle using specified method</p> <p>4c. Identify various factors affecting the fabric comfort in the given situation.</p> <p>4d. Describe with sketches the procedure to measure the fabric drape and fabric crease recovery</p>	<p>4.1 Water and air relation to fabric: absorbency, waterproof, shower proof and water repellent fabrics. Basic concept of wetting: contact angle Measurement: Spray test, Hydrostatic water head test</p> <p>4.2 Air-permeability, Air-resistance, Air-porosity, measurement of air permeability, factors affecting air permeability fabric air relation</p> <p>4.3 Concept of T.I.V (Thermal insulation value.)</p>

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	angle by the given method.	4.4 Stiffness, handle and drape of fabric: measurement of drape, stiffness and handle, Crease recovery, measurement by crease recovery angle.
Unit –V Tensile strength testing	5a. Describe with sketches the specified method to measure yarn strength. 5b. Select the strength test method for the given fabric with justification. 5c. Select the fabric strength test method for the given applications with justification. 5d. Describe with sketches the method to measure strength of the given fabric.	5.1 Tensile Strength, load, elongation, mass stress, tenacity, elastic recovery. 5.2 Yarn strength: measurement of single yarn strength. 5.3 Fabric strength: sample size, principle. 5.4 Measurement of tensile strength, tearing strength and bursting strength.
Unit-VI Colour fastness testing.	6a. Assign grade based on the gray scale using relevant rating for the given colour fastness test. 6b. Describe with sketches the specified method to measure the colour fastness of fabric. 6c. Select the test method for assessment of colour fastness based on the specified end use with justification.	6.1 Gray scale for Colour change 6.2 Gray scale for Degree of staining 6.3 Sample preparation for colour fastness test, Measurement of colour fastness to rubbing, washing, light, perspiration and sublimation.

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	Yarn Testing	10	02	06	06	14
II	Fabric sampling and Dimensional properties	08	02	04	06	12
III	Fabric serviceability	06	02	04	04	10
IV	Fabric Comfort and Handle properties	12	02	06	10	18
V	Tensile strength testing	06	02	02	04	08
VI	Colour fastness testing.	06	02	02	04	08
Total		48	18	28	34	70

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



Note: This specification table provides general guidelines to assist student for their learning and to teachers to teach and assess students with respect to attainment of UOs.. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table

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 conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Undertake a market survey of different qualities of woven, knitted and non woven fabrics used in garment manufacturing units.
- b. Prepare a booklet or folder of fabric collection used in above garment manufacturing units.
- c. Prepare audio- visual power point presentation for showing various test performed to specify the end use. Discuss the rating of fabric based on the result of test performance.
- d. Library survey for collection of norms and standard test procedures of ASTM, ISO, BISFA.

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. '*L*' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- c. About *15-20% of the topics/sub-topics* which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- e. Guide student(s) in undertaking micro-projects.

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. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than *16 (sixteen) student engagement hours* during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- a. Collect different types of woven fabrics based on end use. (ii) Specify the test method required to check the properties of sample fabrics. (iii) Interpret the results based on test performance. (iv) Justify the selection of fabric for the specific end use.
- b. Collect different types of knitted fabrics based on end use. (ii) Specify the test method required to check the properties of sample fabric. (iii) Interpret the results based on test performance. (iv) Justify the selection of fabric for the specific end use.
- c. Visit nearby industries engaged in garment manufacturing using woven fabrics and study various test carried out. Prepare the report of each activity during the industrial visits.
- d. Visit nearby industries engaged in garment manufacturing using knitted or nonwoven fabrics and study various test carried out. Prepare the report of each activity during the industrial visits.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Physical Properties of Textile Fibres'	Morton, W.E; Hearle, J.W.	Wood head publishing 2008. ISBN 978-1-84569-220-9.
2	Hand book of Textile Testing-part-1: Testing and grading of textile fibres.	-	SP 15-1:Published 1989 Bureau of Indian Standards(BIS)
3	Textile Testing Physical, Chemical and Microscopical	Skinkle, John H.	Chemical Publishing Co Inc (1940) ASIN: B001OMN6VS
4	Principles of Textile Testing	Booth, J. E.	CBS publishers; New Delhi; 1996; ISBN 13:9788123905150
5	Testing and Quality Management	Kothari, V.K.	IAFL, New Delhi 1999 ISBN 9788190103305
6	Hand book of Textile Testing and Quality Control	Grover,E.B; Hamby, D.C .	Textile Book Publishers, 1960 - Technology and Engineering the University of Michigan.
7	Physical Testing of Textiles	Saville, B.P.	Wood head publishing Cambridge England, CRC press 2002 ISBN: 0- 8493-0568-3.
8	Methods of Tests, Fibre, Yarn and Fabric	--	CIRCOT, Mumbai
9	A Practical Guide to Textile Testing	Amutha,K.	Wood head Publishing New Delhi India.2016. ISBN:978-93-85059-07-0 .

14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. www.textilelearner.blogspot.in/2012/05/yarn-numbering-system-yarn-count-direct.html
- b. www.textilestudycenter.com/yarn-numbering-system/
- c. www.textilelearner.blogspot.in/2013/03/yarn-twist-relationship-between-yarn.html
- d. nptel.ac.in/courses/116102029/64
- e. www.slideshare.net/fahim55/yarn-twist



- f. www.textilelearner.blogspot.in/2013/03/yarn-twist-relationship-between-yarn.html
- g. npTEL.ac.in/courses/116102029/37
- h. textilelearner.blogspot.com/2012/05/yarn-evenness-unevenness-irregularity.html
- i. www.textilestudycenter.com/yarn-evenness-ii-classification/
- j. www.nptel.ac.in/courses/116102029/29
- k. www.nptel.ac.in/courses/116102029/38
- l. www.textilelearner.blogspot.com/2012/02/fabric-strength-tester-determination-of.html
- m. www.nptel.ac.in/courses/116102029/45
- n. www.nptel.ac.in/courses/116102029/42



Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Third
Course Title : Garment Component Manufacturing
Course Code : 22359

1. RATIONALE

Development of garment components is the first step towards entire garment manufacturing. The student should be able to develop modified garment components from the basic by following relevant process. Skills in garment component manufacturing are to be developed in students through this course. Modifications in garment components play vital role in terms of value addition in fashion industry. Student should be able to apply the knowledge of modification and manufacturing of different garment components.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Use relevant design principles in garment component manufacturing

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- Construct different seam and stitch types.
- Develop different modified plackets, pockets and cuff.
- Construct garment component by applying principle of fullness.
- Develop different classes of collars, necklines and sleeves.
- Use different garment finishing and enclosure techniques in specific situations.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme			Credit (L+T+P)	Examination Scheme												
L	T	P		Theory						Practical						
				Paper Hrs.	ESE		PA		Total		ESE		PA		Total	
Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min			
4	-	4	8	3	70	28	30*	00	100	40	50@	20	50	20	100	40

(*): 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, PrOs, UOs, ADOs 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.

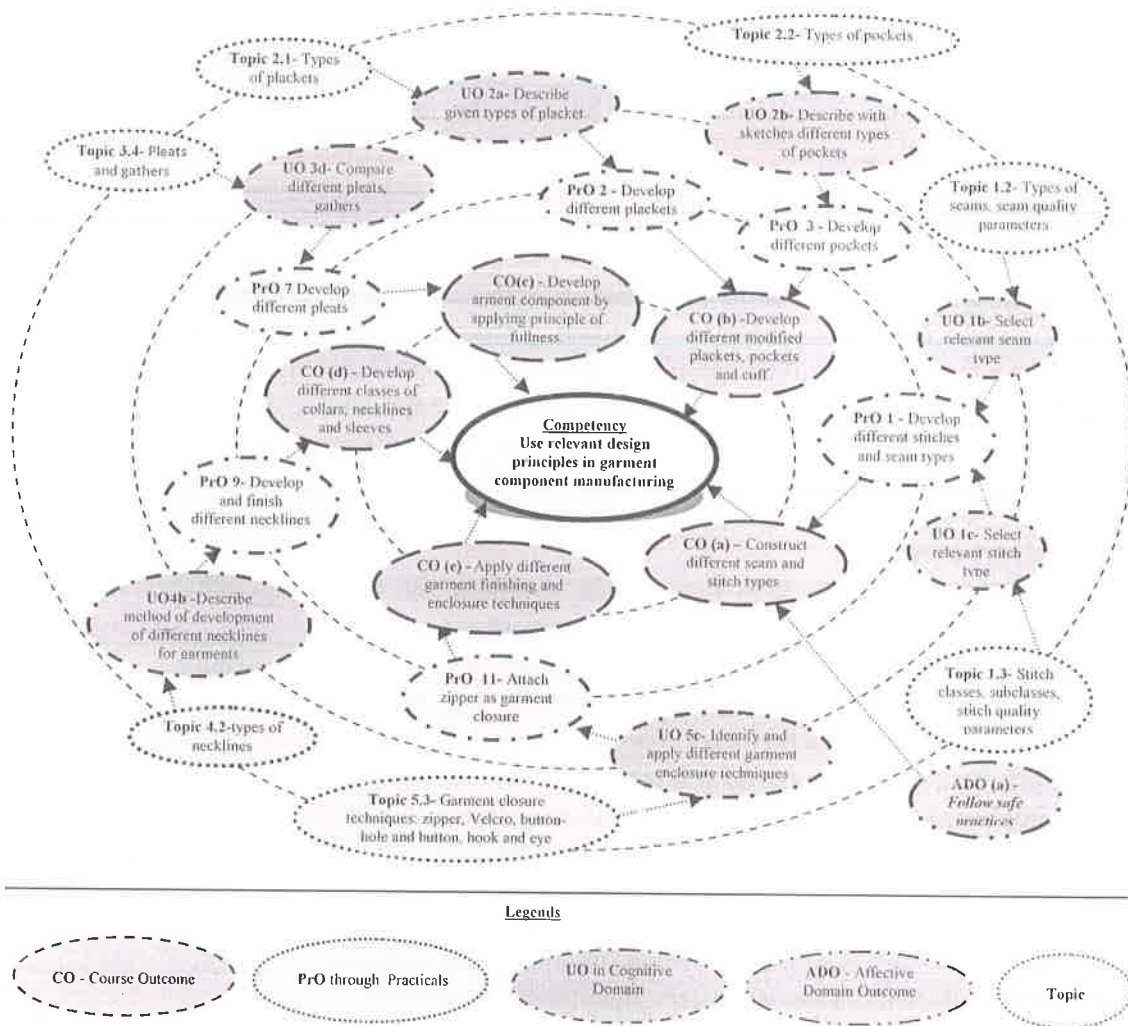


Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Develop different stitches and seam types- Part I	I	02*
2	Develop different stitches and seam types - Part II	I	02
3	Develop different plackets- Part I	II	02*
4	Develop different plackets- Part II	II	02
5	Develop different plackets- Part III	II	02
6	Develop different plackets- Part IV	II	02
7	Develop different pockets- Part I	II	02*
8	Develop different pockets- Part II	II	02
9	Develop different pockets- Part III	II	02
10	Develop different pockets- Part IV	II	02
11	Develop cuff and attach to the sleeve- Part I	II	02*



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
12	Develop cuff and attach to the sleeve- Part II	II	02
13	Stitch single and double dart- Part I	III	02
14	Stitch single and double dart- Part II	III	02
15	Develop different tucks- Part I	III	02*
16	Develop different tucks- Part II	III	02
17	Develop different pleats- Part I	III	02*
18	Develop different pleats- Part II	III	02
19	Develop different collars- Part I	IV	02*
20	Develop different collars- Part II	IV	02
21	Develop different collars- Part III	IV	02
22	Develop different collars- Part IV	IV	02
23	Develop and finish different necklines- Part I	IV	02*
24	Develop and finish different necklines- Part II	IV	02
25	Develop and finish different necklines- Part III	IV	02
26	Develop and finish different necklines- Part IV	IV	02
27	Develop different sleeves- Part I	IV	02*
28	Develop different sleeves- Part II	IV	02
29	Develop different sleeves- Part III	IV	02
30	Develop different sleeves- Part IV	IV	02
31	Attach zipper as garment closure- Part I	V	02*
32	Attach zipper as garment closure- Part II	V	02
		Total	64

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 judicious 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 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.
- ii. The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1	Use of measurement tools.	10
2	Follow the drafting and design principles correctly.	30
3	Use of design tools properly.	20
4	Proportions and Finish of component	10
5	Presentation of output.	10
7	Answer to sample questions	10
8	Submit report in time	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. Practice energy conservation.
- d. Demonstrate working as a leader/a team member.
- e. Maintain tools and equipment.
- f. 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
- 'Organising Level' in 2nd year and
- 'Characterising Level' in 3rd year.
-

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO. S.No.
1	Single needle lockstitch machine, cotton fabric, sewing thread	All
2	Scissors	All
3	Measure tape, marking chalk, tracing wheel, ruler	All
4	Drafted patterns	All
5	Fusible interlining	2,4,8,9
6	Zipper	11

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit – I Sewing Thread- Seams and Stitches	1a. Select relevant sewing thread for the given fabric type with justification. 1b. Select relevant seam type for the given garment with justification. 1c. Select relevant stitch type for the given garment with justification. 1d. Simplify the problems in stitching related to the given type of sewing thread.	1.1 Sewing Thread:-Types, construction, sewing thread quality, selection of sewing thread. Ticket number, packages 1.2 Seams: - Types of seams, seam quality parameters, factors for seam selection, seam finishes 1.3 Stitches: - stitch classes, subclasses, stitch quality parameters, factors for selection of stitches 1.4 Defects related to sewing threads and remedial measures
Unit– II Placket, Pocket and Cuff	2a. Describe with sketches the given types of placket with sketches 2b. Describe with sketches the given type of pocket 2c. Describe with sketches the given	2.1 Plackets : Types- regular, top stitched, edge stitched, concealed placket, kurta placket, faced placket, continuous bound ,diamond plackets, zipper placket



Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	method of stitch and attach cuffs to sleeve	2.2 Pockets: Types of pockets- patch pocket, with lining and flap, front hip, side seam pocket, slash pocket with flap, single lip, double lip. 2.3 Cuff- Making and attaching procedure
Unit– III Fullness in garment	3a. Identify the given yoke type with justification. 3b. Describe with sketches the method of construction of different the given darts 3c. Describe with sketches the procedure to construct tucks suiting to the given garment. 3d. Describe with sketches the procedure to construct pleats, gathers for adding fullness into the given garment.	3.1 Yokes: different styles of yoke- simple yoke, yoke with or without fullness, midriff yokes, methods of attaching yokes. 3.2 Darts : single, double pointed darts, 3.3 Tucks: pin tucks , cross tuck, piped tuck, shell tucks, Comparison 3.4 Pleats: knife pleats, box pleats, inverted box pleats, accordion pleats kick pleats, Flare godets, gathers, shirrings, frills and ruffles. Comparison, Method of attachment for each
Unit– IV Collar, Neckline and sleeve	4a. Describe with sketches the method of construction of suitable collar for the given garment 4b. Describe with sketches the method of development of suitable neckline for the given garment 4c. Describe with sketches the method of Modifying the specified design of basic sleeve 4d. Describe with sketches the given method of construction of relevant sleeves	4.1 Collars: Classification, full roll, flat, partial roll, convertible and non-convertible, shirt collar, sailor collar, peter pan collar, scalloped collar, mandarin, shawl reverse, notch collar. Method of construction of various collars 4.2 Neckline: types of necklines 4.3 Sleeves: Types of sleeves, plain, puff or gathered, bell, Raglan, bishop, leg-o-mutton, Magyar, dolman, kimono 4.4 Method of construction of various sleeves
Unit– V Waistband , Hemming and Garment enclosure techniques	5a. Describe with sketches the given method of construction of suitable waistband for the given garment 5b. Differentiate between the given type of hemming techniques 5c. Select suitable garment closure technique for the given situation with justification. 5d. Describe with sketches the method of construction of suitable closure technique for the given situation.	5.1 Waist Band: types-one piece, two piece, elastic waist band, construction procedure. 5.2 Hemming Techniques: Definition, Selection of hem type, hemming techniques, machines for hemming 5.3 Garment closure techniques: application of zipper, Velcro, button-hole and button, hook and eye 5.4 Procedure of closure

Note: To attain the COs and competency, above listed UOs need to be undertaken at 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	Sewing Thread-Seams and Stitches	10	2	4	6	12
II	Placket, Pocket and Cuff	14	2	4	8	14
III	Fullness in garment	16	4	6	8	18
IV	Collar, Neckline and sleeve	14	2	4	8	14
V	Waistband, Hemming and Garment enclosure techniques	10	2	4	6	12
Total		64	12	22	36	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 students with respect to attainment of UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table.

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 conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Student should maintain a notebook where all the new words which are used in the fashion market will be noted with meanings.
- Students should visit the retail outlets where they will be familiar with various new styles in different garment components.
- Student will visit a garment manufacturing unit to understand about the production process of different garment components.

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:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- 'L' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- With respect to item No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- Guide student(s) in undertaking micro-projects.

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-projects are



group-based. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- a. **Classification of collars and sleeves:** Each student of the batch will classify the garment components based on different styles of collars and sleeves.
- b. **Market Survey:** Survey of different markets for various styles of garment components: Each student of a batch will select one garment component and classify garments for the same.
- c. **Picture Collection:** Collect pictures of various modified garment components.
- d. **Picture Classification:** Classify the garments according to component styles.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1.	Garment Technology for fashion designers	Cooklin Gerry	Black well science Ltd , 1997, England, ISBN No. 978-1-4051-9974-2. 208
2.	Sewing for Apparel Industry	Shaeffer Claire	Pearson Publications, 2000, ISBN No.13: 978-0131884434
3.	Step by step dress making course	Aitken Leila	BBC Books , 1992, England ISBN No. 9781409352617
4.	The Technology of clothing Manufacture	Barbara Latham Carr Herald	Om Book Service, Eng, 1994 ISBN No. 978-1-4051-6198-5. 344

14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. www.pinterest.com/pin/471892867180608344/
- b. www.fashiondesignscope.com/?p=3094
- c. www.businessinsider.in/these-are-the-only-6-types-of-shirt-collars-guys-should-wear-2015-7?r=US&IR=T
- d. www.charlesparsons.com/categories/componentry/
- e. textilefashionstudy.com/basic-components-of-garment-sewing/
- f. books.google.co.in/books?id=jGWWIVedQTQC&pg=PA139&lpg=PA139&dq=garm+ent+components&source

Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Second
Course Title : Surface Ornamentation
Course Code : 22030

1. RATIONALE

This course provides the hands on experience to use different techniques which are useful to create texture and richly embellished fabric and accessory to add value to product. It also helps to add splendor to clothes using decorative methods of handicrafts, yarn crafts, adorn garments as well as in article with own style, more tastefully and skillfully according to design.

2. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Use relevant surface ornamentation techniques.

3. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- Use relevant tools and materials for Surface ornamentation.
- Apply fabric Knotting techniques for developing tie-dye articles.
- Compile motifs of various tribal arts for designing.
- Use designs and create fabric textures for developing articles.

4. TEACHING AND EXAMINATION SCHEME

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

(~): For the **practical only courses**, the PA has two components under practical marks i.e. the assessment of practicals (seen in section 6) has a weightage of 60% (i.e. 15 marks) and micro-project assessment (seen in section 12) has a weightage of 40% (i.e. 10 marks). 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, ESE - End Semester Examination; PA - Progressive Assessment, #: No theory paper.

5. COURSE MAP COs, PrOs, UOs, ADOs 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.

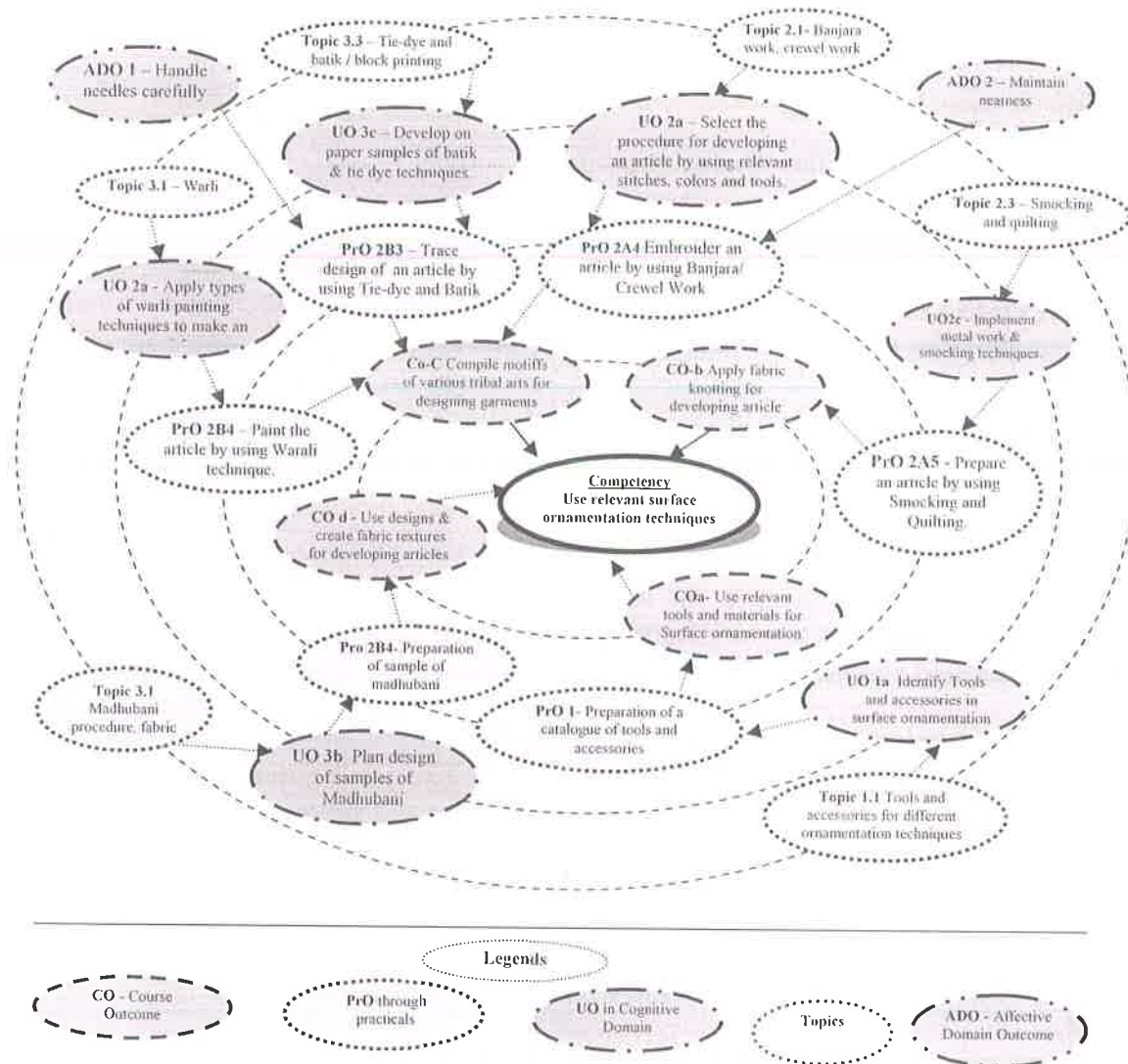


Figure 1 - Course Map

6. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Prepare of a catalogue of tools and accessories and their specifications	I	02*
2	Complete one art work exercise from Group A and one from group B as per development procedure specified from 2A1 to 2A8 or 2B1 to 2B8 or 2C1 to 2C8. Prepare brief report on selected ornamentation techniques as specified.	II, III	
GROUP-A (Tribal Thread Work)			
2A	Prepare any one article by using any one technique i.e. Crewel Work, Toda embroidery, Banjara embroidery, Smocking and Quilting, Metal work, Rabari work -	II	
Steps for Development of art work using Tribal thread			



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
2A1.	Create own design using research work.	II	02
2A2.	Trace own designs on tracing /butter paper.	II	02
2A3.	Develop the design (khaka) and trace the design on the article.	II	02
2A4.	Embroider the sample with suitable stitch types and color schemes	II	02
2A5.	Continue the preceding sample of embroidery/smocking	II	02
2A6.	Complete the embroidery/smocking work	II	02
2A7.	Finish the selected article.	II	02
2A8.	Prepare brief report on selected ornamentation techniques with respect to colour, motif and layout.	II	02
GROUP-B (Tribal Painting and tie Dye Batik)			
2B	Prepare any one article by using any one art i.e. Kalamkari/ Madhubani/ Warali/ Pata folk art/ Miniature painting/ Tie-Dye/ Batik (As per procedure from 2B1 to 2B8 or 2C1 to 2C8)	III	
Steps for Development of Hand Paintings			
2B1.	Create own design using research work.	III	02
2B2.	Trace own designs on tracing or butter paper.	III	02
2B3.	Develop the design (khaka) and trace the design on the article.	III	02
2B4.	Paint the sample with relevant style and color scheme	III	02
2B5.	Continue with the preceding sample	III	02
2B6.	Complete the painting	III	02
2B7.	Finish the selected article.	III	02
2B8.	Prepare brief report on selected ornamentation technique with respect to colour, motif and layout.	III	02
Steps for development of art using Tie-Dye/ Batik/ Block			
2C1.	Prepare the fabric for dyeing	III	02
2C2.	Transfer/tie the design on sample	III	02
2C3.	Prepare the dyebath/ apply wax on the sample	III	02
2C4.	Dye the sample with given colour	III	02
2C5.	Dye with second colour.	III	02
2C6.	Dye with third colour/ different dye class	III	02
2C7.	Finish the process(aftertreatment)	III	02
2C8.	Prepare brief report on selected ornamentation technique with respect to meaning, process and techniques.	III	02
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. In group B only one art (either 2B1 to 2B8 OR 2C1 to 2C8) is to be performed.
- ii. The 'Process' and 'Product' related skills associated with each PrO is to be assessed according to a suggested sample given below:

S. No.	Performance Indicators	Weightage in %
1.	Selecting proper material	10
2.	Selecting proper color combinations and designs	20
3.	Innovative concepts	20



S. No.	Performance Indicators	Weightage in %
4.	Presentation of articles	20
5.	Finishing	20
6.	Submit report and article in time	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:

- Practice good housekeeping.
- Demonstrate working as a leader/a team member.
- Maintain tools and equipment.
- 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
- 'Organising Level' in 2nd year
- 'Characterising Level' in 3rd year.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO. S.No.
1	Frames for metal work, threads, needles scissors	Group A
2	Fabric, Foam, Wax-paraffin, Bees, Embroidery hoops, Needles, Scissors, Trace papers, Embroidery threads, floss, material, carbon paper,	Group B
3	Brushes- flat, round. Pencils, colors such as poster, acrylic, water, oil paints, ink, dye colors, color palate.	Group B
4	Easels	Group B

8. UNDERPINNING THEORY COMPONENTS

The following topics are to be taught and assessed in order to develop the sample UOs given below for achieving the COs to attain the identified competency. More UOs could be added.



Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT-I Tools and Accessories	1a. Identify Tools and accessories in surface ornamentation with justification 1b. Prescribe specifications of tools and accessories to be used in the given situation	1.1 Tools and accessories for different ornamentation techniques 1.2 Specifications of tools and accessories
Unit – II Tribal Thread work	2a Select the procedure for developing an article by using the relevant stitches, colors and tools with justification. 2b Plan the specified design using metal work techniques 2c Plan the specified design using smocking and quilting techniques	2.1.Crewel Work, Banjara 2.2.Rabari embroidery 2.3.Smocking and quilting technique
Unit – III Tribal Painting	3a. Plan the specified design of different types of painting techniques to make an article. 3b. Plan the specified design of samples of batik as per criteria specified 3c. Plan the specified design of samples using tie and dye techniques as per criteria specified.	3.1 Kalamkari, Madhubani, Warli, Pata folk art, Miniature painting 3.2 Batik procedure, fabric selection 3.3 Tie-dye and block printing procedure, fabric selection

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

- Not applicable -

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 conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Organizing exhibitions.
- Taking Custom orders for learn and earn activity.
- Visiting various Designer outlets, Retail showrooms for observing the contemporary application techniques and report preparation.
- Visit tribal places for skill development and collecting samples.

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:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- '*L*' in item No. 4 does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
- About *15-20% of the topics/sub-topics* which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).

- d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- e. Guide student(s) in undertaking micro-projects.

12. SUGGESTED LIST OF 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. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects are given here. Similar micro-projects could be added by the concerned faculty:

- a. Market survey for collecting materials of above topics.
- b. Thematic collection for fashion show with respect to given themes.
- c. Craft documentation for embroidery & painting.
- d. Organize Exhibition.
- e. Develop samples for production houses.
- f. Create a sample based on green fashion.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Complete guide to needle work	Readers Digest	Reader Digest, 1981, ISBN: 978-0340270820
2	Ethnic Embroidery of India	Usha Shrikant	Om Books. 2005, ISBN: 978-8175250796
3	Folk Embroidery of western Himalaya	Subhashini Aryan	Rekha Prakashan, 2010; ISBN-13: 978-8190439411
4	Indian Embroideries	John Irwin	http://91.205.173.47/most-wished-for/indian-embroideries (Free Download) ISBN-39015006733102 UOM:39015006733102
5	Kalamkari: Figures And Designs	K. Prakash	English Edition Publishers, 2004, ISBN: 9788187853640
6	Warali	Sudha Satyawadi	D.K. Printworld, 2010; ISBN:9788124605578
7	Indian Miniature Painting	Anjan Chakraverty	Lustre Press; ISBN-13: 9788174363343
8	Batik & Tie dye Technique	Nancy Belfer	Dover Publications Inc., United States, 1992; ISBN-13: 9780486271316
9	Madhubani Painting	Upendra Thakur	1982, Humanities Books

S. No.	Title of Book	Author	Publication
			ISBN: 9780391024113
10	Pata Paintings of Orissa	B. Mohanty	Ministry of Information & Broadcasting 2011 Government of India ISBN: 9788123017259

14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. www.importantindia.com/1442/tribal-embroidery/
- b. www.fibre2fashion.com/industry-article/5423/toda-embroidery-a-tribal-embroidery
- c. indian-costumes.blogspot.in/2009/03/tribal-embroidery.html
- d. www.indiantribalheritage.org/
- e. www.your-decorative-painting-resource.com/fabric-painting-techniques.html
- f. www.teonline.com/knowledge-centre/fabric-painting.html
- g. www.pidilite.com/productpic/product_pdf/Saree_Designs_195_1
thesewingloftblog.com/fabric-painting-techniques/
- h. www.pinterest.com
- i. www.Indian-heritage.org
- j. www.the-sewing-directory.co.uk.com
- k. <http://91.205.173.47/most-wished-for/indian-embroideries>

