

GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

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

Semester - V

Course Title: Computer Assistance in Fashion & Embroidery Design

(Course Code: 4355903)

Diploma programme in which this course is offered	Semester in which offered
Textile Design	5 th Semester

1. RATIONALE

Computer Assistance in Fashion & Embroidery Design (CAFED) is the application of computer technology to the design/collection development process. CAFED reduces the need for manual sketching, which is essential for fashion designs, flat drawings, pattern making development, manual marker planning, and many other aspects of fashion design. It has reduced the time required and increased output levels. In the Same way, Embroidery software will allow us to create designs on computer before stitching on machine. One can change the colors to suit their choice and preview how they will look like. With the help of embroidery software, we can change designs by making them smaller, larger, adding text, rotating, flipping, removing parts, and even merging separate designs together.

COMPETENCY

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

Students will have the capability to create computerized designs for embroidery patterns & fashion garments with the assistance of software.

2. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

- a) **Create a digitize motif of a given design in embroidery software.**
- b) **Fill the design with various stitches and sequins.**
- c) **Develop a design from a block to a complete garment.**
- d) **Create and simulate realistic 3D models of garments.**

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (CI+T/2+P/2)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	CA	ESE	CA	ESE	
0	-	6	3	-	-	100	100	200

(*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for assessing the attainment 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, **CA** - Continuous Assessment; **ESE** -End Semester Examination.

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. *These PrOs need to be attained to achieve the Cos.*

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx . Hrs. required
1.	<u>Hand Embroidery</u> <ul style="list-style-type: none"> • Make 1 butti with minimum 3 colour by using 7 inch hoop set by hand. • Create 1 butta with minimum 3 colour by using 9 inch hoop set by hand. 	1	2 2
2.	<u>Basics of Embroidery Software</u> <ul style="list-style-type: none"> • Set up of Embroidery software and navigate in it. • Understand different tools of the Embroidery software 	1	2 2
3.	<u>Embroidery Digitization</u> <ul style="list-style-type: none"> • Stitch Type , Digitizing shapes , Object Properties , Colour ways • Create a simple flower outline by hand • Do Digitizing of the flower in Embroidery Software • Creating vector shapes in Embroidery Studio 	3	2 2 2 2
4.	<u>Fill Stitches</u> <ul style="list-style-type: none"> • Draw two motif & fill it with Satin Stitch • Draw two motif & fill it with Satin Raised Stitch & Zigzag Stitch • Draw two motif & fill it with E Stitch & Tatami Stitch • Sequence Fill :- Draw two motif & fill it with Sequence • Center Fill , Jall Fill & Ripple Fill, Eee fill ,Stars Fill • Cross stitch , Canvas & Punching 	2	2 2 2 2 2 2
5.	<u>Decorative Embroidery</u> <ul style="list-style-type: none"> • create 2 types of decorative runs by using back stitch • create 2 types of decorative runs by using stem stitch • create 2 types of decorative runs by using stem stitch • create 2 types of decorative runs by using Patterned stitching 	2	2 2 2 2
6.	<u>Color ways :-</u> <ul style="list-style-type: none"> • Stitch minimum one same design on two types of fabric in different colors . • Create a background & display Colors by the help of display Colors panel in minimum one design 	3	2 2

7.	<p>Create different type of work</p> <ul style="list-style-type: none"> • Make 1 Appliqué work & 1 Sequins work on spiral shape • Make 1 Taping work & 1 Cording work on contour (Square) • Prepare 1 T-shirt using monogramming technique & logo design with Chenille work 	2	2 2 2
<u>FASHION DESIGN</u>			46
8.	<p><u>Basics of 3D Fashion Software</u></p> <ul style="list-style-type: none"> • Set up of 3D Fashion software and navigate in it. • Understand different tools of the 3D Fashion software 	4	2 2
9.	<p><u>Draping Technique</u></p> <ul style="list-style-type: none"> • Add fullness to a Pattern by using a Dart in 3D Fashion software • Create 2 darts inside a Pattern in 3D Fashion software • Slash and spread a Pattern at a particular point in 3D Fashion software 	4	2 2 2
10.	<p><u>Pleats & Zippers</u></p> <ul style="list-style-type: none"> • Create the shape of pleats to Patterns in 3D Fashion software • Create 4 types of pleats & sew them in 3D Fashion software • Create 4 types of Zippers, button in 3D Fashion software 	5	2 2 2
11.	<p><u>Pattern Design</u></p> <ul style="list-style-type: none"> • Create & Cut a 2D Pattern of a shirt with the help of various tools in Fashion software • Create & Cut a 3D Pattern Evening Gown with the help of various tools in Fashion software • Create flat draft of Mermaid skirt block in 3D Fashion software. 	5	2 2 2
12.	<p><u>Avatar</u></p> <ul style="list-style-type: none"> • Create one Avatar design by editing its size & Measurement in 3D Fashion software • Create one runway by record & play the animation video in 3D Fashion software • Sew the pattern in software & dress it in Avatar form in 3D Fashion software 	5	2 2 2
13.	<p><u>Sewing</u></p> <ul style="list-style-type: none"> • Sew the pattern in software & dress it in Avatar form in 3D Fashion software • Sew & tacking with Segment Sewing , Free Sewing , M:N Sewing • Sewing Notch Symmetric Sewing in a 2D Pattern in 3D Fashion software 	4	2 2 2
14.	<p><u>Colorways</u></p> <ul style="list-style-type: none"> • Present a garment in multiple colorways by editing its colour & texture • Calculate amount of fabric required and its cost for a given garment in 3D Fashion software 	5	2 2
Total			84

Note

- i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency..

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Students' understanding and mastery in using different type of tools to create design in Embroidery & Fashion design software	20
2	Imagination skill to think about different garment, measurements, colours & logo to create attractive garment.	20
3	Willingness and attitude to complete different assignment	10
4	Initiative regarding innovative way to complete the assignment	20
5	Overall preparedness and progress during the assignment.	30
Total		100

6. MAJOR EQUIPMENT/ INSTRUMENTS AND SOFTWARE REQUIRED

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

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	Wilcom , CLO ,Velentino ,Stichmax , Marvelous Designer Softwares	1 to 12
2	A3 Size Scanner , A3 Size Colour Printer ,A3 size Drawing Sheet , different sizes hoop , needles , Colour thread for filling stitch , Fabric Sample	1 to 12

7. AFFECTIVE DOMAIN OUTCOMES

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

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

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

- 'Valuing Level' in 1st year

- ii. 'Organization Level' in 2nd year.
- iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

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

Note: *The Unit Outcomes (UOs) need to be formulated at different level of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.*

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit – I Basic of Embroidery Machine & Software	1a. System Requirement , Software & Hardware Setup 1b. Needle, head, Pantograph, Area, Height 1c. Different type of shape 1d. Image Property	1.1 Need of software in Textile Design 1.2 Advantage of Software 1.3 Limitation of Manual Designing Ellipses , Arcs , Pie, Stars 1.4 Spiral , Grid , Arrow , Call Out 1.5 Shape by using Envelope tool , Extruding of the Object , Drop Shadow , Contour 1.6 Back drop Selection ,Crop ,Rotate on Line
Unit – II Embroidery Digitization	2a Stitch Type , Digitizing shapes , Object Properties , Colour ways 2b Effects and Editing 2c Monogram designs, wreaths & arrays 2d Sequin, Appliqué, Bling ,rhinestones embroidery	2.1 Adding decorative borders to designs 2.2 Stitch Effects- freehand, fluffy edges, color blending, Florentine, motif fills,3d effects 2.3 Editing, Transforming, adjusting, scaling lettering 2.4 Eliminating, controlling, reducing & optimizing small stitches 2.5 Colour Combination, Perfect Shape, Size (Area), Stitch Length & Spacing
Unit– III Underlay & Pull compensation	3a. Punching 3b.Stitch types for Lettering 3c.Line Fill 3d.Digitizing	3.1 Embroidery connectors 3.2 Usage of Colorways , palette,threads 3.3 Stitch types for Lettering with stitch designs, Editing , Creating contour fills 3.4 Digitizing tree ,shapes, borders, backstitch, stem stitch ,satin stitch 3.5 Underlays & Pull Compensation
Unit – IV Basic of Fashion Design Software	4a System Requirement , Software & Hardware Setup 4b Simulation , Layer , Grading 4c 3D Simulation & Layer 4d 3D Garment Edit, 3D Arrangement 4e Grading	4.4 Modular Template Files , Sewing Blocks , Edit Block Components 4.5 Real Time Sync/Simulation ,Real Time Garment Move ,High-Definition Garment 4.6 Pattern Layer , Pattern Sub layer ,Sewing Layer , Fold Pattern ,Fold Seam Lines

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
		4.7 Add Pattern Size , Edit Pattern Size
Unit – V 3D Arrangement & Garment Edit	5a 3D Line on Pattern , 3D Pattern 5b Gizmo ,Arrangement Point 5c 2D Pattern Design	5.1 3D Line on Pattern , Cut 3D Pattern ,Flattening ,Select Single/Multi Meshes 5.2 Single/Multi Pins ,Freeze/Deactivate ,Strengthen ,Glue Trim/OBJ 5.3 Gizmo ,Arrangement Point ,Direct Positioning ,Fold Arrangement , Flat/Curved ,Flip Patterns ,Superimpose ,Smart Arrangement

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	Basic of Embroidery Machine & Software	-NA-	-NA-			
II	Embroidery Digitization					
III	Underlay & Pull compensation					
IV	Basic of Fashion Design Software					
V	3D Arrangement & Garment Edit					
Total						

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

Note: This specification table provides general guidelines to assist students for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly 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 perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

- Make Unique & beautiful design by using various tools of the software
- Undertake micro-projects in teams
- Development of new garment design
- Visit any textile company & undergo their design making department

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

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

- a) Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b) Guide student(s) to take micro-projects.
- c) Blend the basic concepts with more specialized instruction
- d) Visualization, Cooperative Learning, inquiry based instruction, differentiation, effective use of technology, think-pair and share etc pedagogies can be implemented as per the enlisted course outcomes.
- e) Give at least 10 competitive problems for each course outcomes of this course
- f) Practice, practice and practice - expose students to wide range of problems
- g) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the students for **self-learning**, but to be assessed using different assessment methods.
- h) With respect to **section No.10**, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- i) Guide students on how to address issues on environment and sustainability using the knowledge of this course

12. SUGGESTED MICRO-PROJECTS

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

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

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

Suggested List of Micro-Project.

1. Design development through Embroidery software for saree
2. Design development through fashion software for any one apparels
3. Make portfolio having collection of different types of Embroidered motifs

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	The Essential Book of Embroidery Stitches	Atelier Fil	Tuva Publishing (2021), ISBN No :- 978-6057834188
2	Embroidery Design: 9 (Needlecraft)	Jan Messent	Search Press Ltd (1979) ISBN (13) -978-0855324261
3	A Text Book of Computer Aided Apparel fashion Designing & Production Pattern Making	Meenu Srivastava	Himanshu Publications (2011) ISBN (13) - 978-8179062517
4	Fashion Design on Computer	M. Kathleen Colussy	Pearson (2000) ISBN (13) - 978-0130838384
5	3D dynamic fashion design development using digital technology and its potential in online platforms	Kyung-Hee Choi	Fashion & Textile (2022) Review Paper

14. SUGGESTED LEARNING WEBSITES

- a) <https://learn3dfashion.com/2023/01/10/free-clo-3d-beginners-course-guide/>
- b) <https://www.wilcomtutorials.com/courses/wilcom-embroidery-software-made-easy>
- c) <https://www.youtube.com/channel/UCJ0pGFCHYcPUICUEs3yz-Sw>
- d) <https://www.futurelearn.com/courses/fashion-technology-a-beginners-guide-to-clo-3d>
- e) <https://www.fashion3dx.com/clo3d-training>

f) 15. PO-COMPETENCY-CO MAPPING

Semester:- III rd	Fashion Illustration & Pattern Making – I						
	Pos						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning
Students will have the capability to create computerized designs for embroidery patterns & fashion garments with the assistance of software.							
Course Outcomes							
CO a)	3	3	3	-	1	2	3
CO b)	3	3	3	-	1	2	3
CO c)	3	3	3	-	1	2	3
CO d)	3	3	3	1	1	2	3

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

16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

Sr. No.	Name and Designation	Institute	Contact No.	Email
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