GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2022 (COGC-2021)
Semester - IV

Course Title: **Apparel Sewing Technology**
(Course Code: 4345106)

Diploma programmes in which this course is offered	Semester in which offered
Computer aided costume design and dress making	Fourth

1.   RATIONALE

A clear need has been perceived for information on clothing manufacturing technology, related to current practice in the clothing industries. This course will provide guidance for garment manufacturing techniques followed by garment industries. It is essential to learn about stiches and seams used in apparel industries, types of sewing needles, sewing threads, sewing machines, alternative methods of joining material, finishing equipments, advance machineries etc. This course is useful for understanding garment manufacturing technology.

2.   COMPETENCY

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

- **Plan and Supervise operations on sewing machines and finishing department as per requirement of garments to be manufactured**.

3.   COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency is to be developed in the student for the achievement of the following COs:
    a) Describe basic stitches, seams and sewing.
    b) Explain different types of sewing machines.
    c) State alternative methods of joining material.
    d) Justify apparel finishing process.

4.   TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**CA**	**ESE**	**CA**	**ESE**	
3	-	-	3	30*	70	-	-	100

 (*): 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. *Some of the **PrOs** marked '*' (in approx. Hrs column) are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Nil		

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 which are embedded in the COs and ultimately the competency.

Sr. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Nil	

6.   MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

This 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.

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1	Nil	

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 t competency.

a)   Work as a leader/a team member.
b)   Realize importance of defective garment waste.

The ADOs are best developed through the laboratory/field-based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:
   i.   'Valuing Level' in 1st year
   ii. 'Organization Level' in 2nd year.
   iii. 'Characterization Level' in 3rd year.

8.   UNDERPINNING THEORY

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

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit – I **Basic Stitches and Seams**	1a**.** State Stitch types 1b. Identify Seam types 1c. Explain Properties of seams	**1.1 Stitch types** 1.1.1. Class-100 Chain Stitches 1.1.2. Class-200 Stitches originating as hand stitches 1.1.3. Class-300 Lock Stitches 1.1.4. Class-400 Multithread Chain Stitches 1.1.5. Class-500 Overedge chain stitches 1.1.6. Class-600 Covering chain stitch **1.2 Seam types** 1.2.1. Class-1 Superimposed seam 1.2.2. Class-2 Lapped seam 1.2.3. Class-3 Bound seam 1.2.4. Class-4 Flat seam 1.2.5. Class-5 Decorative stitching 1.2.6. Class-6 Edge neatening 1.2.7. Class-7 Applied Seam 1.2.8. Class-8 Enclosed Seam **1.3 Property of seams** 1.3.1. Seam strength 1.3.2. Elasticity 1.3.3. Durability 1.3.4. Security 1.3.5. Comfort
Unit – II **Basics of Sewing**	2a Use appropriate Sewing machine Needles 2b Select proper sewing Threads 2c Explain methods of Sewing machine Feed mechanisms 2d. Identify Sewing Problems	**2.1 Sewing machine Needles** 2.1.1. Basic parts of needle 2.2.2. Functions of the needle 2.2.3. Types of needle points and their application **2.2 Sewing Thread** 2.2.1. Fiber type construction and finish 2.2.2. Thread sizing 2.2.3. Thread packages **2.3 Sewing Machine Feed Mechanisms** 2.3.1. Drop Feed 2.3.2. Differential Feed 2.3.3. Top Variable Bottom Feed 2.3.4. Needle Feed 2.3.5. Unison Feed 2.3.6. Cam Feed 2.3.7. Belt Feed 2.3.8. Roller Feed **2.4 Sewing Problems** 2.4.1 Problems of stitch formation 2.4.2. Problems of pucker 2.4.3 Problems of damage to the fabric along with stitch line

Unit – III Sewing Machines	3a Explain working principles of sewing machines. 3b Operate threading and basic setting of the sewing machines 3c Explain about Sewing machine 3d Describe De Skilling & Labour Saving Devices	3.1 Single Needle Lock Stitch Machine 3.2 Double Needle Lock Stitch Machine 3.3 Multi Needle Chain Stitch Machine 3.4 Over Lock Machine (4 thread and / or 5 thread) 3.5 Blind Stitch Machine 3.6 Feed off the Arm Machine 3.7 Button Attaching Machine 3.8 Button Hole Machine 3.9 Bar Take Machine 3.10 Eyelet Machine 3.11 Computerized Embroidery Machine 3.12 Various types of attachments, folders, guides, pressure foot etc.

Unit– IV Alternative methods of joining material	4a State alternative methods of joining material
	4b. Explain fusing process
	4c Use appropriate welding and adhesive for joining material
		4.1 Fusing
		    4.1.1 Requirements of fusing
		    4.1.2 Process of fusing
		    4.1.3 Means of fusing
		    4.1.4 Fusing equipment
		    4.1.5 Methods of fusing
		4.2 Welding and adhesive
		4.3 Molding

Unit– V Finishing department	5a State the activities of finishing department
	5b Explain functions and features of different finishing tools and equipments.
	5c Describe Pressing
		5.1 Activities of finishing department
		    5.1.1 Trimming thread
		    5.1.2 Checking garment
		    5.1.3 Removing stain
		    5.1.4 Ironing garment
		    5.1.5 Folding & tagging garment
		    5.1.6 Packing garment
		    5.1.7 Preparation of packing list
		5.2 Tools and equipments for finishing department
		    5.2.1 Thread trimmer
		    5.2.2 Needle detector
		    5.2.3 Spotting gun
		    5.2.4 Tagging gun
		5.3 Pressing
		    5.3.1 Purpose of pressing
		    5.3.2 Pressing equipment
		        5.3.2.1 Iron
		        5.3.2.2 Steam press
		        5.3.2.3 Vacuum pressing table
		        5.3.2.4 Steam air finisher
		        5.3.2.5 Tunnel finisher

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 Stitches and Seams	10	6	4	7	17
II	Basics of Sewing	10	4	6	7	17
III	Sewing Machines	10	6	4	7	17
IV	Alternative methods of joining material	04	3	3	3	09
V	Finishing department	08	3	3	4	10
	Total	**42**	**22**	**20**	**28**	**70**

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

<u>*Note*</u>: *This specification table provides general guidelines to assist student 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 vary slightly 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. They also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

a) Students will visit to the nearest garment industry.
b) Internet based activities.

11.   SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:
a) Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
b) Guide student(s) in undertaking micro-projects.
c) *'L' in section No. 4* means different types of teaching methods that are to be employed by teachers to develop the outcomes.
d) About *20% of the topics/sub-topics* which are relatively simpler or descriptive in nature is to be given to the students for *self-learning*, but to be assessed using different assessment methods.
e) With respect to *section No.10*, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
f) Guide students on how to address issues on environment and sustainability.
g) Show video films of different cutting processes used in garment industry.

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 microproject should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

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

a) **Fabric waste management:** Prepare a report on fabric waste management in garment unit.
b) **Collection:** Collection of Photographs/ Sketches/ Samples of Seam types, Sewing Needles, Sewing Thread, Sewing Machine Feed Mechanisms, Sewing Problems, Finishing equipment.
c) **Sample preparation:** Prepare samples/ Collection of Photographs/ Sketches of various stitch types and seams on different types of sewing machines.
d) **Chart preparation:** Prepare flow chart of sewing and finishing department.
e) **Chart/posters:** Prepare charts/posters of different types of sewing machines.

13.   SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Technology of clothing Manufacturers	Harold Carr & Barbera Latham	Blackwell Science
2	Apparel Manufacturing Analysis	Jacob Solinger	Bobbin Media Corporation, 1988
3	Managing Quality in Apparel Industry	Mehta &Bharadwaj	New Age Publisher, Delhi
4	Handbook of Quality	Joseph Juran	Mc Graw Hill ISBN 978-0-07-0162973-7
5	Garment manufacturing	Prasanta Sarkar	Online Clothing Study. Gurgaon, India.

14.   SOFTWARE/LEARNING WEBSITES
a) https://www.youtube.com/watch?v=4r4p61Mk84w
b) https://www.youtube.com/watch?v=Joh5yRBK7Wk
c) https://www.youtube.com/watch?v=UeuyZEiEQU0
d) https://www.youtube.com/watch?v=olrA8AmfrMU
e) https://www.youtube.com/watch?v=SI6clx2zJKU
f) https://www.youtube.com/watch?v=G3qRSDF5PvE
g) https://www.youtube.com/watch?v=4C-E-bxOajo
h) https://www.youtube.com/watch?v=ZwUZKeUTJtE
i) https://www.youtube.com/watch?v=V2wPdeay4EY
j) https://www.youtube.com/watch?v=ZdFeH1u-JoQ
k) https://www.youtube.com/watch?v=jEr_SNFMIqw

15.   PO-COMPETENCY-CO MAPPING

Semester IV	Apparel Sewing Technology (Course Code: 4345106)						
	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
Competency	Plan and Supervise operations on sewing machines and finishing department as per requirement of garments to be manufactured						
Course Outcomes Co-a Describe Basics of Stitches and Sewing.	3	2	2	3	2	2	3
Co-b Explain different types of Sewing Machines	3	2	2	3	2	2	3
Co-c State Alternative methods of joining material	3	2	2	3	2	2	3
Co-d Justify apparel finishing process	3	2	2	3	2	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

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