

Program Name : Diploma in Fashion and Clothing Technology
Program Code : DC
Semester : Fourth
Course Title : Clothing Production, Machinery and Equipment
Course Code : 22469

1. RATIONALE

The Garment manufacturing process requires numerous machineries for their manufacture. Also certain super-specialized machineries are used in this field. This course introduces these machineries and uses, their assemblies and parts in detail. Student will learn the different process sequence steps in apparel industry and learn different sewing machine settings which will help them to overcome the problems in production of garments.

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 different types of garment machinery for mass production.

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:

- Develop marker plan for given fabric width.
- Use cutting machine to separate garment components.
- Select suitable needle for given fabric and sewing machine.
- Use relevant sewing machine for specified setting.
- Use relevant work-aids and attachments for specified sewing machines.
- Use fusing and pressing equipment.

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	
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.

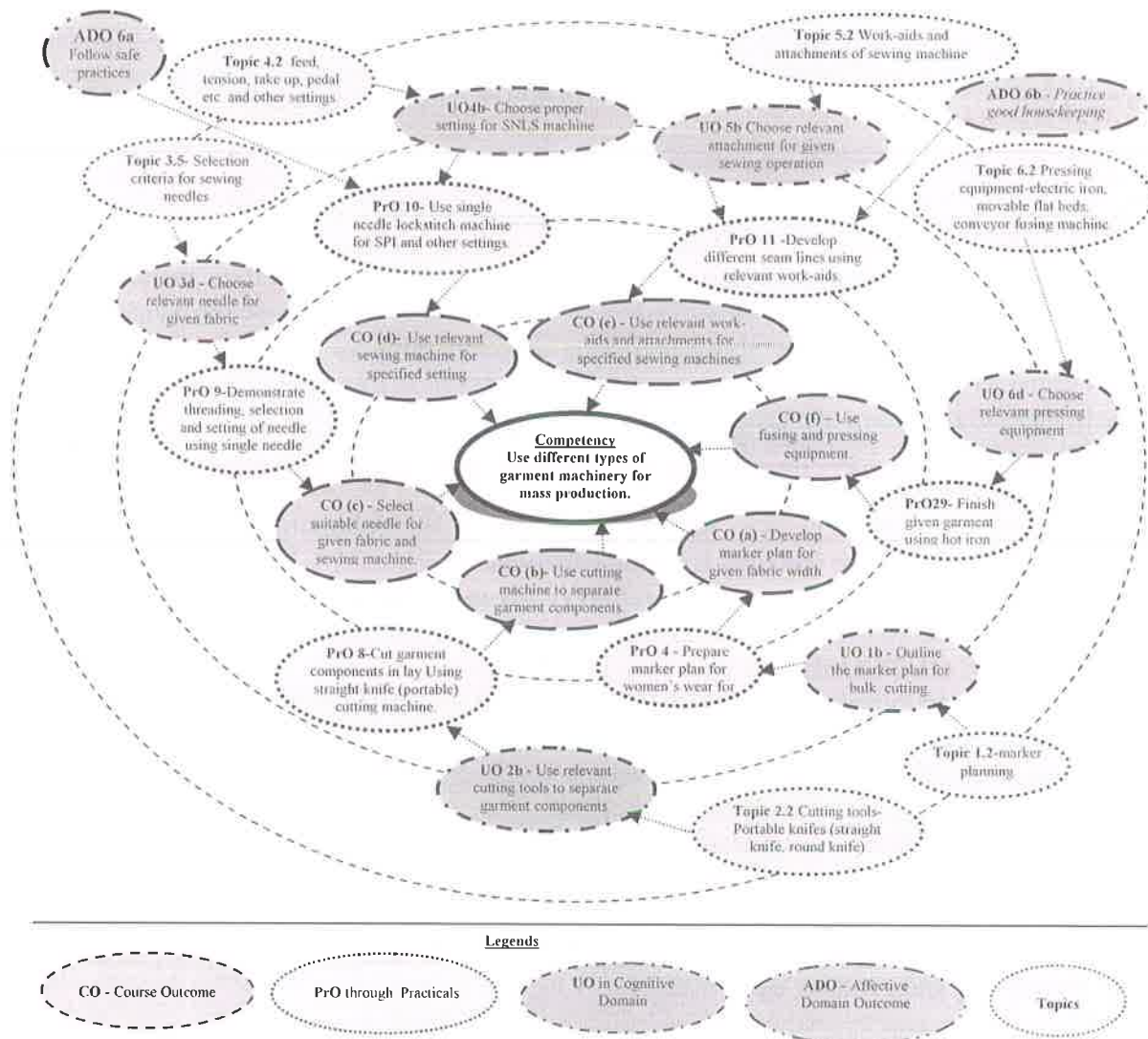


Figure 1 - Course Map

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	Draft and duplicate patterns for men’s wear to prepare marker plan	1	02
2	Prepare marker plan for men’s wear for given fabric width.(1/4 th scale)	1	02
3	Draft and duplicate patterns for men’s wear to prepare marker plan	1	02
4	Prepare marker plan for women’s wear for given fabric width. (1/4 th scale)	1	02
5	Form layer of given fabric using equal spread method (manual)	1	



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
	for given marking length.(part I)		
6	Form layer of given fabric using equal spread method (manual) for given marking length.(part II)	I	02
7	Cut garment components in lay Using round knife (portable) cutting machine.	II	02
8	Cut garment components in lay Using straight knife (portable) cutting machine.	II	02
9	Demonstrate threading, selection and setting of needle using single needle lockstitch machine.	III	02
10	Demonstrate different SPI and other settings using single needle lockstitch machine.	IV	02
11	Develop different seam lines using relevant work-aids.	V	02
12	Develop different seam lines using relevant attachments.	V	02
13	Demonstrate threading, selection and setting of needle, different SPI and other settings using 3-needle and 4-needle over lock machine.	III, IV	02
14	Demonstrate threading, selection and setting of needle, different SPI and other settings using 5-needle over lock machine.	III, IV	02
15	Demonstrate threading, selection and setting of needle using flat lock machine.	III, IV	02
16	Demonstrate different SPI and other settings using flat lock machine.	III, IV	02
17	Demonstrate threading, selection and setting of needle using feed of the arm machine.	III, IV	02
18	Demonstrate different SPI and other settings using feed of the arm machine.	III, IV	02
19	Demonstrate threading, selection and setting of needle using buttonhole machine.	III, IV	02
20	Demonstrate different SPI and other settings using buttonhole machine.	III, IV	02
21	Demonstrate threading, selection and setting of needle using button stitch machine.	III, IV	02
22	Demonstrate different SPI and other settings using button stitch machine.	III, IV	02
23	Demonstrate threading, selection and setting of needle using bar tack machine.	III, IV	02
24	Demonstrate different SPI and other settings using bar tack machine.	III, IV	02
25	Stitch a collar using collar turning machine.(part I)	V	02
26	Stitch a collar using collar turning machine.(part II)	V	02
27	Prepare collar using fusing machine.	VI	02
28	Prepare placket using fusing machine.	VI	02
29	Finish given garment using hot iron.	VI	02
30	Finish given garment using vacuum steam press.	VI	02
31	Produce novel effects on given fabric using special purpose machines.(part I)	IV	02



S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
32	Produce novel effects on given fabric using special purpose machines.(part II)	IV	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	Preparation of experimental set up	20
2	Setting and operation	20
3	Safety measures	10
4	Finish of output	20
5	Creativity	10
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. Demonstrate working as a leader/a team member.
- d. Maintain tools and equipments.
- e. Follow ethical Practices.

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

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

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity 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.
--------	--	---------



S. No.	Equipment/Instruments/Other resources name with Broad Specifications	PrO. No.
1	1/4 th scale, trace paper, pencil(HB,2B), brown sheet, scissor	1 to 4
2	Spreading table, ruler	5,6
3	Eastman round knife cutting machine(4” diameter)	7
4	Eastman straight knife cutting machine(8” height)	8
5	Juki single needle lockstitch machine	9 to 12
6	Modified presser feet, binder, folders and guides	11,12
7	Silverson 3-needle, 4-needle,5-needle over lock machine	13 to 14
8	Silverson flat lock machine	15 to 16
9	Silverson feed of the arm machine	17,18
10	Silverson button hole and button stitch, bar tack machine	19 to 24
11	Fusing machine with conveyor belt	27, 28
12	Phillips steam press and vacuum steam press table (industrial)	29, 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 Marker Planning and Spreading	1a. Identify the processes in the specified flow chart of apparel industry. 1b. Outline the marker plan for bulk cutting of the given type of material. 1c. Distinguish the features of the between the given types of spreading. 1d. Distinguish the features of the between the types of given fabric packages.	1.1 Process flow chart in apparel industry. 1.2 Marker planning- definition, manual and computerized marker planning, Types of marker (block, continuous, half garment, whole garment, single size, multiple size (sectional, interlocked, mixed size), factors affecting efficiency of marker plan. 1.3 Spreading –Definition, Types of spread (Single, multiple, stepped ply) and forms of spreading (One way, face to face and two way), Requirements for fabric spreading- methods (Manual, Spreading carriage, automatic spreading). 1.4 Types of fabric packages and importance of longer length fabric packages.
Unit– II Cutting and Cutting tools	2a. Identify requirements for quality cutting of the given type of material. 2b. Choose the relevant cutting tool(s) to separate the specified garment components with justification. 2c. Distinguish the salient features of the given type of cutting tools.	2.1 Types and requirements of quality cutting 2.2 Cutting tools- Portable knives (straight knife, round knife); Stationary knives (band knife, die cutting machine); Specialized Knives – notchers, drills, 2.3 Advanced cutting techniques- laser cutting, ultrasonic cutting, water jet cutting 2.4 Defects in cutting and their remedies.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	2d. Suggest the remedies in the defects in cutting with justification.	
Unit – III Sewing Needles	3a. Identify the functions of the given type of needle (s) 3b. Describe with sketches the specified type of needle 3c. Choose relevant needle for given fabric with justification 3d. Suggest ways to minimize the specified defects produced due to faulty needles	3.1 Types and classification 3.2 Parts in needle 3.3 Functions of different parts in sewing needle 3.4 Sewing Needle sizes- American and European needle numbering systems. 3.5 Selection criteria for sewing needles 3.6 Defects due to faulty needles
Unit– IV Sewing Machines	4a. Describe with sketches the parts in the specified type of sewing machine 4b. Select the relevant setting in the SNLS machine for the specified type of fabric. 4c. Describe with sketches the salient features of the Over-lock machine and Flat-lock machine. 4d. Describe the threading diagram of the given type of machine.	4.1 Single Needle Lock stitch Sewing machine (SNLS)- Threading Diagram, parts and their functions, feed, tension, take up, pedal and other settings. 4.2 Over-lock machine- classification, Threading Diagram, parts and functions, differential feed mechanism, Needle Height, Feed dog Height Angles, Position of upper and Lower Knife, 4.3 Flat lock machine-Threading Diagram, parts and functions 4.4 Buttonhole and button stitch- Threading Diagram, parts and functions. 4.5 Feed of the arm- Threading Diagram, parts and functions 4.6 Bar tack machine- Threading Diagram, parts and functions.
Unit– V Work-aids and Attachmen ts	5a. Identify relevant work-aids for the given seams 5b. Choose relevant attachment for the given sewing operation with justification 5c. Describe with sketches the procedure to use the given type of attachment.	5.1 Work-aids and attachments-definition and advantages 5.2 Work-aids and attachments of sewing machine- Rollers ,Guides, Folders, modified presser, feet, Hemmer 5.3 Placket making, Pocket making attachments, 5.4 Collar turning machine
Unit VI Fusing and Pressing	6a. Choose relevant fusing method for the given situation with justification. 6b. Choose relevant fusing equipment for the given	6.1 Fusing: Concept, Objectives and Requirements; Types -Fabrics used and Resins; Methods of application of resin Requirements -Time, Temperature, Pressure; Equipment-electric iron,



Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	situation with justification 6c. Choose relevant pressing parameters for the given type of garment (s) with justification 6d. Choose relevant pressing equipment for the given type of garment (s) with justification	movable flat beds, conveyor fusing machine. 6.2 Pressing : Terms - Under, Moulding, Top Pressing; Types - Dry, Steam, High Pressure Steam; Accessories - Ironing Board, Sleeve Board, Bucks; Equipment - Mechanical, vacuum press, steam air mixture, Steam tunnel

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	Marker Planning and Spreading	10	02	04	06	12
II	Cutting and Cutting Tools	10	02	06	08	16
III	Sewing Needles	04	02	02	02	06
IV	Sewing Machines	18	04	06	06	16
V	Work-Aids and Attachments	10	02	04	04	10
VI	Fusing and Pressing	12	02	04	04	10
Total		64	14	26	30	70

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

Note: This specification table provides general guidelines to assist student for their learning and to teachers to teach and assess 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 samples of simple clothing utility pieces using domestic sewing machine.
- Present seminar of about 20 minutes on any relevant topic.
- Internet survey regarding use of different work aids used in garment industry.
- Prepare journals based on practical performed in workshop. Prepare power point presentation or animation for showing different types sewing machine features.

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.
- f. Demonstrate students thoroughly before they start doing the practice.

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. **Collection of various types of sewing threads and needles:** each student should collect 10 different types of needles and sewing threads used in garment manufacturing and prepare a catalogue with description and application.
- b. **Visit to garment factories and compare the flow process charts:** Each batch of students should visit 3 to 4 different garment factories and draw the process sequences. They will collect information about the names, specifications and manufacturer's names of machines and tools used in the process. They will prepare a report.
- c. **Comparison between sewing machines of different make:** Each student should select 2 sewing machines from minimum 4 manufacturers and compare the features.
- d. **Collection of different work-aid literature:** each student should search for minimum 10 work aids and attachments and prepare a report about its features/ uses.
- e. **Collection of samples of different fusible interlinings:** Prepare booklet of showing various ornamented design and express cam order and relevant needle order for each designs.
- f. **Collection of palm plates for different modern sewing machines:** each batch of students should collect information about 10 modern sewing machines and prepare report.
- g. **Sewing machine motor:** each student should collect information about motors used in garment manufacturing.

13. SUGGESTED LEARNING RESOURCES



S. No.	Title of Book	Author	Publication
1.	The Technology of clothing Manufacture	Harold Carr and Barbara Latham	Om book Service. England ISBN- 978-1405161985
2.	Stitches and Seams	R.M.Laing and Webster J.	Manchester, England ISBN-9781870812733
3.	Sewing for Apparel Industry	Shaeffer Claire	Prentice Hall, New Jarsey, USA ISBN- 9780131884434
4.	Sewing Lingerie	The Editors	cy De cosse Incorporated (1991) ISBN 13: 9780865732605

14. SUGGESTED SOFTWARE/LEARNING WEBSITES

- a. textilelearner.blogspot.com/2015/09/marker-planning-requirements-of-marker
- b. [/www.scribd.com/doc/94099552/Spreading-and-Cutting-of-Apparel-Products](http://www.scribd.com/doc/94099552/Spreading-and-Cutting-of-Apparel-Products)
- c. www.youtube.com/watch?v=
- d. www.youtube.com/watch?v=2681yeSrsM0
- e. www.youtube.com/watch?v=TfTwK7E_3CQ
- f. www.youtube.com/watch?v=KII3t0BOIN8



