National Vocational Certificate Level 2 in Textiles (CAD/CAM Operator)

CBT Curriculum

NATIONAL VOCATIONAL & TECHNICAL TRAINING COMMISSION

NAVTTC نیوٹک

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Content

1. INTRODUCTION

Name of the course: CAD/CAM Operator (Apparel/Textile)

Overall objective of the Course

The objectives of this course are to train the people in such a way so that

- They can participate in the progress of readymade garment industry of the country.
- To increase the technical main power for CAD/CAM Computerized Pattern Designing System.
- To increase the employment.
- To fulfil the technical requirements of garment industry.
- To push them in the flow of economy
- To give them confidence
- To stay-able status in the society.

Competencies gained after completion of the course

At the end of the course, the trainee must be able to attain the following competencies.

- Demonstrate the use of Basic Computer Operations including CAD/CAM Devices
- Learn the use of CAD/CAM Software
- Troubleshoot various issues related to System, CAD/CAM Devices and software
- Operating CAD/CAM Software and using various commands to complete the task
- Use of CAD/CAM software Explorer
- Use of Tech Pack
- Create, maintain and apply Storage Are, User Environment, Notches, Lay Limits and Annotations
- Use Digitiser and its cursor
- Digitise a Pattern
- Grade Patterns according to Rule Table
- Make Model and Order Process
- Make Marker
- Calculate Fabric Consumption
- Plot Pattern
- Organize and Maintain Work Place Environment
- Communicate with Co-workers
- Demonstrate Health and Safety procedures
- Develop Professionalism

- Manage Time
- Work in a Team

Knowledge Proficiency Details

On successful completion of course, the trainees must have acquired the following knowledge & skills:

- About Computer Operations
- Using Operating System
- Using CAD/CAM Software
- About CAD/CAM Devices
- Digitising Pattern
- Pattern Grading
- Marker Making
- Marker Plotting

Job Opportunities available immediately and in future

After completion of the training, candidates can find the employment opportunities in the following disciplines..

Institutes & industries in which opportunities will be available:

- Governmental institutes.
- Semi Governmental Institutes.
- Private Institutes.
- Buying Offices.
- Apparel Industry.
- Textile Industry

Entry requirements

- Intermediate

Minimum qualification of trainer

2 year pattern designing diploma associated with CAD/CAM.

OR

B.Sc. Textile Engineering 2- Year Industrial cum training experience in garment industry.

Medium of Instruction

- English/Urdu

Timeframe of assessment

Duration of Course	Six Months
Total Hours	800 hrs
Training Hours	771 hrs
Module Test	25 hrs
Final Test	4 hrs
Per Week Hours	30 hrs
Per Day Hours	05 hrs (6 days a week)

2. Overview about the program – Curriculum for CAD/CAM Operator

Module Title & Aim	Learning units	Theory Hours	Workplace hours	Total Hours
Module 1: Basic Computer Operations **Objective**: This module develops competency to carry out basic computer operations	**LU1:** Computer hardware and software. **LU2**: Attaching CAD/CAM devices to computer system	08	16	24
Module 2: Manage systems **Objective**: This module develops competency to create storage areas and to maintain client records, measurement results and files in hard and soft format.	**LU1**: Creating a storage area for client record **LU2**: Establishing User Environment for client storage area **LU3**: Making Annotations to pattern **LU4**: Creating Notches in pattern **LU5**: Applying Lay Limits	12	48	60
Module3: Digitise patterns **Objective**: This module develops Competency to enable learner to digitise a	**LU1**: Digitising procedures **LU2**: Operating Digitiser to digitise the pattern	24	180	204

Module Title & Aim	Learning units	Theory Hours	Workplace hours	Total Hours
pattern from the given manual pattern.				
Module4: Grade patterns **Objective**: This module develops Competency to create different size charts of a base pattern to meet specified customer requirements in accordance with the given tech pack.	**LU1**: Creating Rule Table **LU2**: Applying Rule Table for grading **LU3**: Making Model for a complete garment **LU4**: Completing Order process	30	166	196
Module 5: Create Marker Making **Objective**: This module develops Competency to create marker sets, in accordance with the technical pack, using the CAD/CAM software.	**LU1**: Drawing Marker using CAD/CAM software **LU2**: Sending Marker to Plotter	20	214	234
Module 6: Occupational health and safety (OHS) precautions **Objective**:	**LU1**: Understanding requirements of workplace health, safety and security. **LU2**: Following workplace health, safety and security procedures.	16	30	46

Module Title & Aim	Learning units	Theory Hours	Workplace hours	Total Hours
This module develops Competency in the practices of health safety and security precautions required for a safe working environment	**LU3**: Maintaining a safe work area **LU4**: Dealing with emergency situations			
Module7: Develop professionalism **Objective**: This module develops competency to enable a learner to develop professional attitude and maintain professionalism at the workplace environment.	**LU1**: Communicating with co-worker **LU2**: Managing time **LU3**: Upgrading skills **LU4**: Keeping the workplace clean **LU5**: Working within a team	16	20	36
Assessment Project				
Total Hours		**126**	**674**	**800**

3. Teaching Learning Guidelines for CAD/CAM Operator (Apparel/Textile)

Module 1 Title: BASIC COMPUTER OPERATIONS

Objective of the Module: This module develops competency to carry out basic computer operations.

Suggested duration: 24 Hours **Theory: 8 Hours** **Practice: 16 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Computer hardware and software.	Demonstrate knowledge of: • Basic computer applications using fundamental components of a computer system. • Computer operations including file saving, data retrieval and data back up • Computer hardware types	• Computer hardware and peripherals e.g. Keyboard, Monitor, Mouse, Printer, RAM, HDD, VGA, ROMs and Cables • Safety measures. • Procedure of starting the computer. • Different applications, interfaces and their versions related to their need • Creating and maintaining files in Operating system's Explorer. • Different operating systems used for pattern making	12	Multimedia, White board, marker, visual aids, Computer system, Input & output devices.	CAD/CAM Lab/Class room

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU2: Attaching CAD/CAM devices to computer system	• Demonstrate methods of attaching CAD/CAM devices to computer. • Follow appropriate safety procedures when attaching CAD/CAM devices to the computer systems. • Troubleshoot different issues related to using CAD/CAM devices and drivers.	• CAD/CAM devices e.g. plotter, digitiser & CAD/CAM customised software etc. • Compatibility issues related to computer software and hardware. • OHS measures when using CAD/CAM devices • Procedure of attaching CAD/CAM devices to the system. • Troubleshooting of CAD/CAM devices and drivers.	12	Multimedia, White board, marker, audio/visual aids, Computer system, CAD/CAM devices and its software e.g. Gerber, Richpiece, Lectra, Investonica etc.	CAD/CAM Lab/Class room

Module 2 Title: Manage Systems

Objective of the Module: This module develops competency to create storage areas and to maintain client records, measurement results and files in hard and soft format.

Duration: 60 Hours **Theory: 12 Hours** **Practice: 48 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Creating a Storage Area for Client Record	• Collect client details for creation of a storage area • Follow CAD/CAM Explorer requirements to create storage area for client • Input client details and save into created storage area	• Importance of Technical Package (Tech Pack) and its purpose • Use of Tech Pack to analyze & create Client storage area • Safe management of client storage area and records • Use of CAD/CAM Explorer	08	Whiteboard, multimedia, Tech Pack, computer system, CAD/CAM software	Class room/ CAD/CAM Lab
LU2: Establishing User Environment for Client Storage area	• Select appropriate user environment from CAD/CAM Explorer • Choose Metric or Imperial measurement system according to client requirements • Ensure User Environment is saved to meet client requirements	• CAD/CAM User Environments • Metric and Imperial measurement systems • Importance of saving all work • Importance of saving client records to meet client User Environment	08	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU3: Making Annotations to pattern	• Create piece Annotations for different pattern type, Model, and additional client order requirements • Stamp marker or piece to identify client and client pattern requirements using standard software coding	• Client Annotation requirements • Pattern Annotations • Standard software coding for pattern and Marker Annotation • Applying and verifying selected Annotations for patterns and Markers	20	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab
LU4: Creating Notches in pattern	• Set parameters of Notches according to Tech Pack • Make different type and size of notches on pattern according to client requirements • Apply notch type and size to pattern according to Tech Pack	• Size and type of Notches • Setting of Notches parameters Notch depth, Notch width • Adjusting and verifying Notches	12	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab
LU5: Applying Lay Limits	• Set lay limits according to Single ply, Face to Face or Tubular requirements • Identify the limit of piece placement on fabric • Save data to	• Importance of Lay Limits to pattern • Lay Limits for Single Ply, Face to Face and Tubular fabrics • Flip and rotate parameters to a piece • Select the range of rotate piece for a	12	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
	designated client Storage Area according to workplace procedures	Marker • Adjustment and verification of Lay Limit • Data saving for a marker			

Module 3 Title: Digitize Patterns

Objective of the Module: Competency to enable learner to digitise a pattern from the given manual pattern.

Duration: 204 Hours **Theory: 24 Hours** **Practice: 180 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Digitising procedures	• Ensuring that CAD/CAM software is installed and functioning properly • Turning the digitiser & equipment on. • Checking the equipment is working properly	• Basic pattern and garment types • Interpretation of pattern parts and components • Digitiser table and cursor's tools and its functions • Menu bar and function keys of Digitiser	24	Whiteboard, multimedia, computer system, Digitiser, Cursor, CAD/CAM software	Class room/ CAD/CAM Lab
LU2: Operate Digitiser for Pattern digitising	• Placing pattern on the designated area on the digitiser according to the grain line • Ensuring the pattern is not wrinkled or creased before placing on the digitiser. • Using different function keys from the menu and cursor to digitize pattern. • Ensuring all points of the pattern are marked using the Cursor.	• Importance of Grain Line • Placement of pattern on digitiser table • Pattern name, category, piece description and rule table • Function of various keys and menu bar • Pattern grading points and application of Notches • Draw curve shapes and straight lines of pattern • Start Piece and End Piece.	180	Whiteboard, multimedia, computer system, Digitiser, Cursor, Pattern, CAD/CAM software	Class room/ CAD/CAM Lab

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
	• Returning the cursor to its prescribed holder at the conclusion of the digitising procedure.				

Module 4 Title: Grade Patterns

Objective of the Module: This module develops competency to create different size charts of a base pattern to meet specified customer requirements in accordance with the given tech pack.

Duration: 196 Hours **Theory: 30 Hours** **Practice: 166 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Creating Rule Table	• Setting user Environment • Reading and interpreting the relevant size charts • Inputting dimensions into Rule Table for sizes required according to Tech Pack • Completing Rule Table by inputting all required sizes • Inserting values of X and Y axes according to Tech Pack to complete the Rule Table	• Importance of rule table to CAD/CAM operations • Different sizes required by customer (S/M/L, etc.) • Principles of grading • Rule table and how to create and apply knowledge • Relationship of rule table to Technical Pack • X axes and Y axes value to create Rule Table • Range of Rule Table	32	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab
LU2: Applying Rule Table for grading	• Selecting required digitised pattern piece for grading. • Applying appropriate Rule Table to show grading by using function keys • Viewing graded piece by using	• Grading rules • Use of X and Y axes • Use of CAD/CAM software commands • Application of Rule Table • Rule verification procedures for correct grading	80	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
	'Show Nest All' command • Using 'Export Rule' command to check the application of all rules. • Verifying and adjusting variances after grading • Saving graded pattern to designated storage area according to workplace procedures	• Manage grading with the help of 'Export Rule' command			
LU3: Making Model for complete garment	• Checking all pattern pieces required to complete a Model • Selecting quantity of garment parts from designated storage area for Marker Making • Using commands for placing pattern pieces on fabric. • Inserting fabric type, piece and Flip command and Add Piece option	• Procedures to check pattern pieces required for a complete garment • Fabric colour type • Different options for Model Making • Flipping of pattern piece on different dimensions (X-axis, Y-axis) • Use of Paste piece and Normal piece option • Adjustment and verification of Edit piece and Retrieve piece	52	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU4: Completing Order Process	• Collecting all data required to Process Order • Selecting Model, size breakdown and quantities required in Order to process Marker • Completing Order for Marker by using 'Save and Process' command to designated storage area	• Available width of fabric for cutting • Target Utilization and marker efficiency % • Length target setting for a marker • Quantities and sizes of garment for cutting • Lay Limit type • Shrinkage of fabric	32	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab

Module 5 Title: Create Marker Making

Objective of the Module: This module develops competency to create marker sets, in accordance with the technical pack, using the CAD/CAM software.

Duration: 234 Hours **Theory: 20 Hours** **Practice: 214 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Drawing a Marker using CAD/CAM software	• Selecting order name from CAD/CAM Explorer's drop-down menu for marking • Dragging and dropping pieces to Marker space from model display • Adjusting pieces as required to achieve optimal usage of available fabric • Verifying number of pieces according to required garment sizes and quantities • Saving Marker to designated Storage Area	• User Environment • Drag and drop technique for laying out pattern pieces in CAD/CAM screen environment • Maximizing usage of available fabric • Best utilization • Adjustment and verification of pattern size and quantity in a Marker • Different directional commands for Marker Making (flip, rotate, tilt, etc.) • Professional techniques of placing pattern pieces in Marker	200	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software	Class room/ CAD/CAM Lab

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU2: Sending Marker to Plotter	• Ensuring plotter is correctly attached to CAD/CAM system • Checking paper width in plotter matches fabric width • Using 'Plot' command to send completed Marker to Plotter or automatic cutting machine	• Correct connection of plotter to CAD/CAM system • Paper widths commonly used in Plotters • Parameter setting for plotting • Plotting command	34	Whiteboard, multimedia, computer system, Tech Pack, CAD/CAM software, Plotter, Paper	Class room/ CAD/CAM Lab

Module 6 Title: Occupational Health and Safety (OHS) Precautions

Objective of the Module: This module develops competency in the practices of health safety and security precautions required for a safe working environment.

Duration: 46 Hours **Theory: 16 Hours** **Practice: 30 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Understanding requirements of workplace health, safety and security.	• Maintaining a safe working environment and safe system to work. • Using and maintaining machinery, equipment, appliances and tools in a safe working condition. • Ensuring that everyone is safe from injury and risks to health in emergency situations.	• Requirements for a safe working environment • Maintenance procedures for machinery, equipment, appliances, tools • Handling tools and equipment properly • Ergonomics suitable for the work environment • Health, safety and security guidelines	08	Whiteboard, multimedia, computer system, Health, safety and Security standards	Class room
LU2: Following workplace health, safety and security procedures.	• Reporting hazardous situations, fatalities, injuries and illness. • Controlling and minimising the risks to ensure that injury or illness is prevented.	• Hazard Identification processes • Risk assessment and control processes • Precautionary measures and their utilisation to preventing damage to health.	08	Whiteboard, multimedia, computer system, Health, safety and Security standards	Class room

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU3: Maintaining a safe work area	• Handling cables related operations appropriately. • Installing electronic devices at a manageable distance as per industry requirements. • Handling sharp implements or tools properly. • Maintaining safe distances between self and machinery, and machine-to-machine. • Using appropriate accessories and tools.	• Manage cables related issues • Use and handling of electronic equipment • Precautions to minimise electrical risks. • Importance of Proper dressing • Keeping the workplace organized • Use of appropriate tools	06	Whiteboard, multimedia, computer system, Health, safety and Security standards	Class room
LU4: Dealing with emergency situations	• Ensuring inexperienced workers receive the necessary supervision in case of any hazardous work. • Providing instructions to ensure that everyone is safe in emergency situations. • Providing first aid if required.	• Emergency situations and how to deal with it. • Assembly points • Reporting to consulting departments/personnel • Location of First Aid box • Identify and locate trained First Aid responder	24	Whiteboard, multimedia, computer system, First Aid Box	Class room

Module 7 Title: Develop Professionalism

Objective of the Module: This module develops competency to enable a learner to develop professional attitude and maintain professionalism at the workplace environment.

Duration: 36 Hours **Theory: 16 Hours** **Practice: 20 Hours**

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
LU1: Communicating with co-worker	• Communicating within a department. • Communication with other departments. • Dealing with vendors. • Interaction with other organisations. • Using various media to communicate effectively.	• Communication Tools • Communication ethics • Dealing with vendors and other organisations. • Appropriate use of electronic and relative media when required • Effective communication with Junior staff and Co workers • Communication within the department and interaction with other departments	06	Whiteboard, multimedia, computer system.	Class room
LU2: Managing time	• Managing time to complete the assigned work. • Managing workload as per task. • Checking own work regularly to ensure accuracy • Handling time	• Importance of Punctuality • Maintaining task calendars • Importance of multitasking • Checking of work (self / supervisors) • Importance of	08	Whiteboard, multimedia, computer system, Workplace Procedure Guidelines	Class room

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
	division with co-workers.	managing time according to task priorities, involving management and co-workers.			
LU3: Upgrading skills	• Participation in skill tests • Attending seminars / workshops. • Participating in competitions time to time. • Awareness upcoming market trends.	• Importance of staying up-to-date • Development of personal skills and efficiency • Improvement of skill sets over time by way of seminars, workshops and competitions. • Importance of trends and market research to work role	04	Whiteboard, multimedia, computer system and Workplace Procedure Guidelines	Class room
LU4: Keeping the workplace clean	• Keeping the workplace organised. • Ensuring clean working environment.	• Requirements of a clean and organised workplace • Effective and efficient organisation of work area • Importance of observing hygiene	06	Whiteboard, multimedia, computer system, Workplace Procedure Guidelines	Class room
LU5: Working within a team	• Showing good team skills. • Taking an appropriate appearance. • Showing comfort and tolerance.	• Skills required to successfully participate in teams • Workplace standards for professional appearance as a	12	Whiteboard, multimedia, computer system, Workplace Procedure Guidelines	Class room

Learning Unit	Learning Outcome	Learning Elements	Duration (Hours)	Material Required	Learning Place
	• Presenting and observing good work ethics.	CAD/CAM operator • Interpersonal skills required to work within teams • Requirements for work ethics for CAD/CAM operator role.			

4. ASSESSMENT GUIDANCE:

Assessment is the process of collecting evidence and making judgments on whether competence has been achieved. This confirms that an individual can perform to the standard expected in the workplace as expressed in the nationally endorsed competency standards (where they exist), Good assessment practices should be adopted for developmental and final assessments. Such practices by vocational training providers during developmental and final assessments will form the basis of qualifying the trainees.

4.1 Differences between developmental and final assessments

Developmental assessment shall be on an all-time basis. Its purpose is to provide feedback on what students are learning:

- To the student: It will identify achievement and areas for further teaching and its level.
- To the teacher: It will evaluate the effectiveness of teaching, and guide to determine the future plan.

Assessors need to advise developmental assessments for each competency standard. Guidance is provided in the assessment strategy.

Final assessment is the assessment, usually carried out on completion of a course. This determines whether or not the student has "passed". It is - or should be - undertaken with reference to all the objectives or outcomes of the course, and is formal. Considerations of security - ensuring that the student who gets the credit is the person who did the work - assume considerable importance in final assessment.

4.2 Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For work place lessons, assessment will focus on the quality of planning and executing the related process along with the quality of the product and/or evaluation of the process.

Direct assessment:

Direct assessment is the most desirable form of assessment. For this, evidence shall be obtained by directly observing the student's performance.

Examples for direct assessment of a Machinist will include:

- Work performances, such as the application of correct and appropriate sawing techniques to a workpiece
- Demonstrations, for example correctly demonstrating the appropriate method of drilling using a drill machine.
- Direct questioning, where the assessor will ask the student the reasons they selected a tool for step turning
- Paper-based tests, such as multiple choice or short answer questions on entrepreneurship, hygiene and safety issues, communicating and working with others, and types of milling machine, etc.

4.2.2 Indirect assessment

Indirect assessment shall be used where the performance could not be observed and evidence is gained indirectly.

Examples for indirect assessment of a Machinist will include:

- Portfolio of evidence, such as compilation of all work produced during the course
- Working safely every day
- Reports from third parties, such as internship workplace employer or supervosir
- Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work produced by the person being assessed).

4.3 Principles of assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information. Provide all learners with an equal opportunity for and access to assessment

Validity means that a valid assessment assesses what it claims to assess. For example, for the competency of cutting a specific gear, the assessment should involve performance criteria that are directly related to gear cutting techniques. An interview about setting of milling machines would not meet this principle.

Reliability means that the assessment is consistent and reproducible. For example, if the preparation procedure of workplace/services area has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should re-schedule to ensure the loss of power does not disadvantage the students.

4.5 Suggestions for developmental assessment

- The developmental assessment shall only be used to determine the learning progress of students.
- The development assessment can be undertaken at regular intervals through the delivery of a competency standard to inform teachers of any learning gaps that need to be addressed promptly
- No marks are given in any developmental assessment.
- The developmental assessment, undertaken at the end of the delivery of a competency standard, should be recorded for quality assurance purposes

4.6 Suggestions of final assessment

Final assessment shall be in two parts:

- Knowledge assessment

The final knowledge assessment shall consist of multiple choice and short answer questions, covering all modules. It is a national assessment document supplied by NAVTTC.

- Practical assessment.

The final practical assessment shall consist of a series of tasks designed to provide evidence of competence across all competency standards of the qualification. It is a national assessment document supplied by NAVTTC.

Module 1 Title: BASIC COMPUTER OPERATIONS

Objective of the Module: This module develops competency to carry out basic computer operations.

Duration: 24 Hours **Theory: 8 Hours** **Practice: 16 Hours**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M1- LU1: Computer Hardware and software.	**8**	**16**	Trainee will ✓ Explain the difference between input and output devices, their importance, functions. ✓ Describe various computer peripherals ✓ Demonstrate the: o installation of input and output devices to the system o use of Operating system's interface	✓ Oral ✓ Practical/Demonstration ✓ MCQs ✓ Written test	
M1- LU2: Attaching			Trainee will		

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
CAD/CAM devices to computer system			✓ Classify various health and safety procedures ✓ Describe various CAD/CAM devices and software. ✓ Demonstrate the process of installing & troubleshooting CAD/CAM devices and drivers.		

Module 2 Title: Manage System

Objective of the Module: This module develops competency to create storage areas and to maintain client records, measurement results and file in hard and soft formats.

Duration: 60 Hours **Theory: 12 Hours** **Practice: 48 Hours**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M2- LU1: Creating a storage area for client record	**12**	**48**	Trainee will ✓ Explain the importance of creating storage area within CAD/CAM explore ✓ Describe the procedure of using Tech Pack ✓ Demonstrate the use of CAD/CAM explorer for creating a Storage Area	✓ Oral ✓ Practical/ Demonstration ✓ MCQs Written test	At the end of module
M2- LU2: Establishing User Environment for client storage area			Trainee will ✓ Explain the use of User Environment ✓ Define Metric and Imperial measurement systems ✓ Demonstrate the process of establishing a User Environment		
M2- LU3: Making Annotations to pattern			Trainee will ✓ Explain Annotations and their		

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
			importance ✓ Describe various Annotation types. ✓ Demonstrate process of making Annotations		
M2- LU4: Creating Notches in pattern			Trainee will ✓ Explain different types of Notches ✓ Describe the importance of Tech Pack and its importance ✓ Demonstrate parameters setting of a notch according to Tech Pack and its application to pattern		
M2- LU5: Applying Lay Limits			Trainee will ✓ Explain the importance of Lay Limits to pattern making ✓ Describe Lay Limits for single ply, Face to Face and Tubular fabrics ✓ Demonstrate the procedure of Lay Limits on each fabric type.		

Module3 Title: Digitise Pattern

Objective of the Module: This module develops competency to enable learner to digitise a pattern from the given manual pattern.

Duration: 204 Hours **Theory: 24 Hours** **Practice: 180 Hours**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M3-LU1: Digitising procedures	**24**	**180**	Trainee will ✓ Explain Digitiser's functions ✓ Describe Cursor and function of its keys ✓ Demonstrate the setting of digitiser table and use of cursor for digitise purposes	✓ Oral ✓ Practical/ Demonstration ✓ MCQs Written test	At the end of module
M3-LU2: Operating Digitiser to digitise the pattern			Trainee will ✓ Explain how to place a pattern on the digitizer table. ✓ Describe the use of menu bar ✓ Demonstrate complete procedure for digitizing a manual pattern		

Module 4 Title: Grade Patterns

Objective of the Module: This module develops competency to create different size charts of a base pattern to meet specified customer requirements in accordance with the given tech pack.

Duration: 196 Hours **Theory: 30 Hours** **Practice: 166 Hours**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M4-LU1: Creating Rule Table	**30**	**166**	Trainee will ✓ Describe the purpose and function of the rule table ✓ Describe principles of Grading ✓ Demonstrate the creation of Rule table	✓ Oral ✓ Practical/ Demonstration ✓ MCQs Written test	At the end of module
M4-LU2: Applying Rule Table for grading			Trainee will ✓ Explain Rule verification procedures for correct grading ✓ Describe the functions of 'Show Nest All' command ✓ Demonstrate the application of Rule Table on Pattern by using show nest all command.		
M4-LU3: Making Model for complete garment			Trainee will ✓ Explain the procedures to check		

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
			pattern pieces required for a complete garment ✓ Describe Different options for Model Making ✓ Demonstrate the procedures of making a Model for a complete garment		
M4-LU4: Completing Order process			Trainee will ✓ Explain the importance of 'Save and Process' command and its relationship to completing the Order process ✓ Describe various fabric widths available for cutting ✓ Demonstrate the procedure of Order Processing		

Module 5 Title: Create Marker Making

Objective of the Module: This module develops competency to create marker sets, in accordance with the technical pack, using the CAD/CAM software.

Duration: 234 Hours **Theory: 20 Hours** **Practice: 214 Hours**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M5-LU1: Drawing a Marker using CAD/CAM software	**20**	**214**	Trainee will	✓ Oral ✓ Practical/	At the end of module

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
			✓ Explain the verification procedures for Marker ✓ Describe different directional commands used for marker making ✓ Demonstrate the procedure of drawing a Marker from CAD/CAM Explorer	Demonstration ✓ MCQs Written test	
M5-LU2: Sending Marker to Plotter			Trainee will ✓ Explain purpose of plotter. ✓ Describe step by step procedure of plotting a marker. ✓ Demonstrate plotting of a Marker set.		

Module 6 Title: Occupational Health and Safety (OHS) Precautions

Objective of the Module: This module develops competency in the practices of health safety and security precautions required for a safe working environment**.**

Duration: 46 Hours **Theory: 16 Hours** **Practice: 30 Hour**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M6-LU1: Understanding requirements of workplace health, safety and security.	**16**	**30**	Trainee will ✓ Explain the necessity of health and safety procedure. ✓ Describe the importance of	✓ Oral ✓ Practical/ Demonstration ✓ MCQs Written test	At the end of module

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
			Ergonomics.		
M6-LU2: Following workplace health, safety and security procedures.			Trainee will ✓ List down possible hazardous and emergency situations at a workplace. ✓ Explain how to deal with a fire outbreak at workplace. ✓ Write down the process of reporting an emergency situation to the relevant department.		
M6-LU3: Maintaining a safe work area			Trainee will ✓ Explain the importance of maintaining the cables. ✓ List down the precautions to minimise electrical risks.		
M6-LU4: Dealing with emergency situations			Trainee will ✓ Explain emergency situations and how to deal with them ✓ Describe the use of First Aid Box ✓ Perform first aid services to a bleeding person.		

Module 7 Title: Develop Professionalism

Objective of the Module: This module develops competency to enable a learner to develop professional attitude and maintain professionalism at the workplace environment.

Duration: 36 Hours **Theory: 16 Hours** **Practice: 20 Hours**

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
M7-LU1: Communicating with co-worker	**16**	**20**	Trainee will ✓ Explain communication platforms within and outside a department. ✓ Describe the importance of proper communication tools in maintaining professional relationships in the workplace. ✓ List communication tools.	✓ Oral ✓ Practical/ Demonstration ✓ MCQs Written test	At the end of module
M7-LU2: Managing time			Trainee will ✓ Explain importance of managing time at workplace ✓ Describe the importance of proper time division ✓ List various distractions that can waste time.		
M7-LU3: Upgrading skills			Trainee will ✓ Explain why skill upgrading is required and its importance.		

Learning Unit	Theory Days/hours	Workplace Days/hours	Recommended Formative Assessment	Recommended Methodology	Scheduled Dates
			✓ Describe different ways of upgrading a skill		
M7-LU4: Keeping the workplace clean			Trainee will ✓ Explain the importance of a clean and organized workplace ✓ List 4/5 examples of an disorganized workplace and how they could be improved		
M7-LU5: Working within a team			Trainee will ✓ Explain why tolerance and patience is important within a team work. ✓ Describe the importance of working together		

List of Machinery/Equipment/Tools

(For a Class of 25 Students)

Name of Trade	CAD/CAM Operator (Apparel/Textile)
Duration of Course	**6 Months**

Sr.#	Nomenclature of Equipment/Tools	Quantity
1	Systems (computer set)	25
2	CAD/CAM Software	26
3	Plotter	01
4	Digitizer	01
5	Scales	25
6	Measuring tapes	25
7	Working tables	05
8	Stapler	01
9	First aid box	01
10	Fire extinguishers	01
11	White Board	01
12	Multimedia/Projector with Screen	01
13	UPS	25
14	Printer	01

List of Consumable Materials

(For a Class of 25 Students)

Sr.#	Name of Material/Items	Quantity/Student	Total Quantity
1	Led pencils	02	50
2	Erasers	02	50
3	Paper roll (plotter paper)	01	25
4	Staple pins	01 box	25 boxes
5	Ebro tape	01	25
6	OHS Guidelines and Standards	01	25
7	Plotter pen	01	25
8	Plotter Cartridge	01	01
9	Printer Cartridge	01	01

Reference Material

- Course Manual for Data and System Management
- Course Manual for Marker Making
- Tech Packs
- OHS Standards/Guidelines
- Colleagues
- Internet facility
- Helping Notes Of CAD/CAM Software
- Pattern and Grading Books

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