KNITTING MACHINES

CBT Curriculum

National Vocational Certificate Level 2

Version 1 - July 2015

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1. INTRODUCTION

A knitting machine operator is responsible for operating the machines according to knit fabrics and other articles according to yarns such as cotton, wool, nylon and rayon etc. he must be able to set up the creels and install yarn to the machine(s) for further operation. He must also be able to identify the technical discrepancies, if any and fix them for smooth operations. He should be involved in maintenance of the equipment e.g. oiling and cleaning of the machinery.

1.1 Description of the structure of the course

Module #	Title	Theory (Hours)	Practical (Hours)	Total (Hour)
1	Introduction to Knitting	25	7	32
2	Setting up Knitting Machine according to Work Specifications	25	145	170
3	Carrying Out Knitting Operations	55	275	330
4	Carrying Out Repair and Maintenance of Knitting Machines	30	140	170
5	Develop Professionalism	17	41	58
	Total	**152**	**608**	**760**

1.2 Duration of the course:

The proposed curriculum is composed of **05** modules that will be covered in 760 hrs. It is proposed that the course may be delivered in a six months period (Five days a week).Training can also be scheduled on part time bases or in the evening classes. The distribution of contact hours is given below:

Total **760 hrs**

Theory **152hrs (20%)**

Practical **608hrs (80%)**

1.3 Specific characteristics of this training programme:

- This training programme is intended to be conducted at institutes; possessing adequate training facility e.g. equipped training room, tools, material etc.
- This training programme caters for the safety and precautionary measures to be practiced during training as well as at workplace, to eliminate any chance of injury.
- The training program covers; Design Development, surface ornamentation techniques, hand embroidery, machine embroidery, adda embroidery, Health, safety and Precautions and Entrepreneurship Development etc.

1.4 Main objectives of the training programme

The objectives of this course are to:

- Acquire the operating skill and knowledge of Knitting Machine Operator along with minor maintenance of machine.
- Produce skilled manpower for Knitted Garments/ Hosiery Industry.

- Improve the level of skill of workers in industry and increase the economic potential of the country.
- Provide industry with skilled workers whose scope with job knowledge and skills are identified.
- Assist in human resources development by providing precise and assessed country's skilled manpower quantitatively, as well as qualitatively.
- Provide technical and vocational training which reflects the requirements of industry.

1.5 Skill development by action orientation:

On successful completion of course, the trainees must have acquired the following knowledge &skills (Operational and basic maintenance)

- Basic machine components
- Functions and uses of various machines
- Accessories of various machines and their functions
- Quality control

1.6 Entry level of trainees

- Middle preferably Matriculation
- Minimum age limit for trainees will be 15 years and above.

1.7 Minimum qualification for teachers

- BSc Textile Engineering.
- Diploma in Textile Technology with 03 Years Industrial cum Teaching Experience.

- Matriculation along with 6 month Certificate in Knitting Machine Operator Course with 05 years industry as well as teaching experience.

The main aim of training providers is to develop work related skills and competency through comprehensive action orientation. This includes the willingness and ability of a student to act appropriately and professionally in different situations at work. The willingness and ability of students depends largely on the teacher's skills to perform goal-oriented tasks. This can be achieved by putting their technical knowledge and skills to use by developing a program of practical assessment that reflects learning outcomes given in the curriculum. The trainer will also support students in developing personal characteristics such as self reliance, reliability, responsibility, group sense and the ability to lead.

1.8 Medium of instruction

Urdu, local language

1.9 Laws and Regulations

- Material Good Storage Practices.
- ISO 9001:2008 Including core standards for health.
- Pakistan Standard and Quality Control Authority (PSQCA)Standards.
- Workplace regulations 1992 Ministry of Labour, Govt of Pakistan
- Deal with hazards in accordance with workplace instructions and legal requirements.
- The Management of Health and Safety at Work Regulations 1992 (dermatitis and asthma).
- Hazard Analysis and Critical Control Point(HACCP).

1.10 Recommended teaching materials

- Trainer Guide and Learner Guide.
- Research through internet about latest knitting technology.

1.11 Definition of trade

A Knitting Machine Operator, also called a Knitter, is an important job-role associated with Apparel Sector. The primary responsibility of a Knitting Machine Operator is to set up knitting machine, produce knitted fabric and maintain knitting machine as per industry standards.

1.12 Job Opportunities available immediately and in the future

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

- Cottage Industry
- Garment Factories
- Entrepreneurship

1.13 Competencies gained after completion of the course

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

- Knitting Types, Techniques etc.
- Set up knitting machine according to work specifications.
- Produce knitted fabric using different machines.

- Maintain and remove faults in knitting machines.
- Demonstrate professionalism

1.14 Personal requirement:

A Knitting Machine Operator should have good eyesight, eye-hand-leg coordination, motor skills and vision including near vision, distance vision, colour vision, depth perception and ability to change focus.

2. OVERVIEW OF THE CURRICULUM FOR KNITTING MACHINE OPERATOR

Module Title and Aim	Learning Units	Theory Hrs.	Workplace Hrs	Timeframe of Modules
Module 1: **Introduction to Knitting** **Aim:** This module is designed to gain the basic knowledge about knitting including parts & types of machines, historical perspective of knitting and current innovations of knitting all over the world.	**LU-1:** Basics of knitting **LU-2:**Techniques of knitting and knit stitch types **LU-3:** Historical perspective of knitting **LU-4:** Current innovations of knitting	**25**	**7**	**35**
Module 2: **Setting up Knitting Machine according to Work Specifications** **Aim:** This module is designed to gain the basic knowledge about different methods of setting up of knitting machines. The competencies cover the knowledge and understanding about arranging different types of raw material and preparing machine for knitting.	**LU-1:** Arrange Raw Material for Knitting Operations **LU-2:**Prepare Machine for Knitting	**25**	**145**	**170**
Module 3: **Carrying Out Knitting Operations** **Aim:** This module is designed to gain the basic knowledge and skills about carrying out different knitting operations using different types of knitting machines. The standard	**LU-1:** Communicate Operational Information to Co-workers **LU-2:**Feed Yarn into Knitting Machine **LU-3:**Produce Knitted Fabric according to Work	**55**	**275**	**330**

covers the specific occupational health and safety precautions required to be observed during the knitting operations.	Specifications			
Module 4: **Carrying Out Repair and Maintenance of Knitting Machines.** **Aim:** This module is designed to gain the knowledge and skills to carry out repair and maintenance of knitting machines. This module covers the procedures and skills to install machine components and to perform cleanliness, oiling and greasing of machine parts.	**LU-1:**Replace Needles, Cams and Sinkers of the Knitting Machines**.** **LU-2:**Clean Machine Components**.** **LU-3:**Perform Oiling of Machine Components **LU-4:**Perform Greasing of Machine Components	**30**	**140**	**170**
Module 5: **Develop Professionalism.** **Aim:**This module is designed to differentiate professionalism and being professional. This way of being is made up of appearance, manner, communication, interacting, attitudes, approach, skills and openness to grow. Professionalism is a combination of taught aspects, like knowledge and skills, and learning gained through experience.	**LU-1:**Communicate with Co-Workers **LU-2:**Manage time. **LU-3:** Upgrade skills **LU-4:**Keep the workplace clean **LU-5:**Work in a team **LU-6:**Ensure Health and Safety	**17**	**41**	**58**

3. KNITTING MACHINE OPERATOR CURRICULUM CONTENTS

(Teaching and Learning Guide)

3.1 Module 1: Introduction to Knitting

Objective of the Module:. This module is designed to gain the basic knowledge about basics of knitting including parts & types of machines, historical perspective of knitting and current innovations of knitting all over the world.

Duration: 32 hours **Theory:** 25hours **Practice:** 07hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1: **Basics of knitting**	**Trainee will be able to:** • Explain knitting and its importance. • Identify different knitted products. • Classify different types of knitting machines commonly using in knitting industry. • Recognize different parts of knitting machines.	• Definition of knitting • Importance of knitting and knitted products. • Types of Knitting Machines: 1. **Circular Knit:** Single Knit, Double knit 2. **Flat Knit:** Accessories, Rib Knit machine,Socks & Gloves etc 3. **Hosiery Machines**	**Total:** 6Hrs **Theory:** 6Hrs **Practical:** 0 Hrs	**Non-Consumables:** • Creel • Feeder • Needle Detector • Needle Track • Sinkers Ring • VDQ Pulley • Pulley Belt • Tension Disk • Yarn Guide • Sensor • Cylinder • Cylinder Balance • Spreader • Fixation Feeder	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		4. **Warp Knitting:**Raschel, Tricot • Parts of Knitting Machine (Creel, Feeder, Needle, Needle Detector, Needle Track, Sinkers, Sinkers Ring, VDQ Pulley, Pulley Belt, Tension Disk, Yarn Guide, Sensor, Cylinder, Cylinder Balance, Spreader, Fixation Feeder, Inlet & Outlet Stop Motion, MPF Wheel, MPF i.e. Maminger Positive Feed, Feeder Ring, Disk Drum, Pattern Wheel, Cam Box, Cam, Lycra Attachment Device, Lycra Stop Motion, Uni-wave Lubrication, Adjustable Fan, Expander, Air Gun Nozzle)		• Inlet & Outlet Stop Motion • MPF Wheel MPF i.e. Maminger Positive Feed • Feeder Ring • Disk Drum • Pattern Wheel • Cam Box • Cam • Lycra Attachment Device • Lycra Stop Motion • Uni-wave Lubrication • Adjustable Fan • Expander • Air Gun Nozzle • White Board **Consumables:** • Needles • Sinkers • Note book • Pencil Eraser Sharpener • Whiteboard Marker	

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-2: **Techniques of knitting and knit stitch types**	**Trainee will be able to:** • Identify different knitting techniques • Recognize different types of knit stitches.	• Explain different techniques of Knitting: (Basket, Bead Knitting, Bias Knitting, Binding / casting off, Bobble, Brioche Knitting, Button holes, Casting on, Double Knitting, Drop-Stitch Knitting, Entrelac, Faggoting, Finer Knitting, Gather, Grafting, Hemming, Lace, Medallion Stitch, Picking Up Stitching, Pleat, Ribbing, Shadow Knitting, Short Row, Slip-Stitch Knitting, Spool Knitting, Three Needle Blind Off, Tuck, Uneven Knitting) • Explain different types of Knit Stitches:(Stocking stitch, garter, decrease, dip stitch, elongated stitch, increase, plaited stitch, yarn over)	**Total:** 10 Hrs **Theory:** 8Hrs **Practical:** 2Hrs	**Non-Consumables:** • Internet with computer • Projector • Hand knit needles in different nos • White board **Consumables:** • Different types of yarns • Beads • Note book • Pencil Eraser Sharpener • Whiteboard Marker	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-3: **Historical perspective of knitting**	**Trainee will be able to:** • Explain different eras of knitting	• Origin of Knitting • Industrial revolution • Revival of knitting during early 21st Century	**Total:** 6 Hrs **Theory:** 6 Hrs **Practical:** 0 Hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:** • Note book • Board markers • Pencil Eraser Sharpener • Whiteboard Marker	**Theory:** Class Room **Practical:** Workplace/Lab
LU-4: **Current innovations of knitting**	**Trainee will be able to:** • Describe different innovations happening all over the world in knitting industry. • Identify seamless products. • Identify fusion of float plating technology with other materials.	• Latest developments in knitting industry. • Seamless Technology • Float Plating Technology	**Total:** 10Hrs **Theory:** 5 Hrs **Practical:** 5Hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:** • Note book • Pencil Eraser Sharpener • Whiteboard Marker	**Theory:** Class Room **Practical:** Workplace/Lab

3.2 Module 2: SETTING UP KNITTING MACHINE ACCORDING TO WORK

Objective of the Module:. This module is designed to gain the basic knowledge about different types of setting up of knitting machines. The competencies cover the knowledge and understanding about arranging different types of raw material and preparing machine for knitting.

Duration: 170 hours **Theory:** 25 hours **Practice:** 145 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. **Arrange Raw Material for Knitting Operations**	**Trainee will be able to:** • Receive and interpret work order correctly. • Prepare and send demand requisition to store department for issuance of raw material. • Check the demand requisition is prepared correctly in terms of type, quantity and quality of raw material and is in accordance to work order. • Store the material according to type and category.	• Types of raw materials used in knitting operations • Quality of different types of yarn like cotton, wool, nylon, polyester, acrylic, polypropylene, viscose, lycra & other different types of yarns blends • Difference in greiege yarn and dyed yarns. • Different properties of yarns including strength, abrasion resistance. • Concept of stitch length, gauge & GSM. • Understanding work orders	**Total:** 30 Hrs **Theory:** 5 Hrs **Practical:** 25 Hrs	**Non-Consumables:** • Yarn Tension Meter • Abrasion Meter • Draw Meter • GSM Cutter • GSM Scale • Scissor • Measuring Scale • Computer • Internet • White Board **Consumables:** • Plastic Sheet • Yarn • Note book • Pencil Eraser	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		including internal purchase orders. • Method of preparing demand requisition for arranging raw material. • Method of storing raw material according to types of yarns as per desired design, production plan etc and category of yarns as per production plan.		Sharpener • Whiteboard Marker	
LU-2. **Prepare Machine for Knitting**	**Trainee will be able to:** • Receive and interpret work specifications from supervisor. • Check, replace and install needles in the knitting machine according to work specifications. • Carry out yarn batching according to work specifications. • Follow proper procedure for loading yarn into knitting machine.	• Different types of knitting machines & overview of knitting machines like circular, flatbed, jacquard etc • Re-checking work specifications again. • Method of installing needles in the knitting machine. • Method of yarn batching. • Procedure of joining and knotting of yarn. • Importance of wearing Personal Protective	**Total:** 140 Hrs **Theory:** 20 Hrs **Practical:** 120 Hrs	**Non-Consumables:** • Toolkit • Indicator Meter • Cylinder • Dial • White Board • Computer with internet **Consumables:** • Needles • Safety Masks • Note book • Pencil Eraser Sharpener	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		Equipment (PPEs). • Machine settings including electronic, automated & mechanical.		• Whiteboard Marker	

3.3 Module 3: CARRYING OUT KNITTING OPERATIONS

Objective of the Module: This module is designed to gain the basic knowledge and skills about carrying out different knitting operations using different types of knitting machines. The standard covers the specific occupational health and safety precautions required to be observed during the knitting operations.

Duration: 330 hours **Theory:** 55 hours **Practice:** 275 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. **Communicate Operational Information to Co-workers**	**Trainee will be able to:** • Maintain and prepare production reports. • Document adjustments to machine and discuss with appropriate person. • Record operational instructions on every step. • Pass on received information to co-workers for smooth knitting operations.	• General workplace practices. • Principles and method of communications including verbal & written. • Method of preparing production reports in consultation with production department & immediate supervisor. • Factors affecting machine performance like yarn strength, measurement (sizing), ambient conditions, etc. • Knitting methods and techniques.	**Total:** 70 Hrs **Theory:** 20 Hrs **Practical:** 45 Hrs	**Non-Consumables:** • Computer with internet • White Board **Consumables:** • Job Order Formats • Work Order Formats • Notebook • Pencil • Eraser • Sharpener	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-2. **Feed Yarn into Knitting Machine**	**Trainee will be able to:** • Load yarn into knitting creels according to production plan. • Use appropriate method to perform knotting of yarn into feeders.	• Functions of machine parts such as cams, needles, sinkers and feeders of different types of knitting machines. • Technique of yarn knotting. • Procedure of loading yarn into knitting creels.	**Total:** 60 Hrs **Theory:** 10 Hrs **Practical:** 50 Hrs	**Non-Consumables:** • Air compressor • Clipper • Safety Mask • Computer with internet • White Board **Consumables:** • Yarn • Oil and Lubricants • Note book • Pencil Eraser Sharpener • Whiteboard Marker	**Theory:** Class Room **Practical:** Workplace/Lab
LU-3. **Produce Knitted Fabric according to Work Specifications**	**Trainee will be able to:** • Produce sample and match it with the standard provided by the client after initial check of machine by the supervisor. • Start production after approval from supervisor. • Monitor knitting machine	• Fabric quality and checking parameters. • Making of single knit, double knit and different types of knitted fabrics. • Making of jacquard, seamless & seam fabrics & garments. • Technique of fabric roll	**Total:** 200 Hrs **Theory:** 20 Hrs **Practical:** 180 Hrs	**Non-Consumables:** • Cutter • Yarn Trolley • Pantone Books • Grey Cards • Pick Glass **Consumables:** • Yarn	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	operation to detect faults and problems during production. • Fix minor problems (e.g. machine and fabric related) during operations and report to appropriate person in case of major problems. • Use appropriate method and technique to cut roll after required weight age. • Inspect fabric using fabric inspection table to check minor defects in the roll. • Observe occupational health and safety precautions at all times to work. • Follow work and production schedules as communicated by the supervisor.	cutting. • Matching specifications of standard received from client with the sample produced. • Pantone matching, grey card etc. • Fabric structure. • Minor and major problems during production. (Holes, creasing, lines, yarn breakages, incorrect yarn tensions & joins, incorrect creeling, mechanical breakdown, electric or electronic faults, poor feeding & threading of needle, dirty or oily marks, sinker lines) • Quality parameters to be observed during monitoring of knitting operations. • Understanding of different types of quality scaling systems. • Method of fabric		• Notebook • Pencil • Eraser • Sharpener • Whiteboard Marker	

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		inspection/quality checking.			

3.4 Module 4: CARRYING OUT REPAIR AND MAINTENACE OF KNITTING MACHINES

Objective of the Module: This module is designed to gain the knowledge and skills to carry out repair and maintenance of knitting machines. This module covers the procedures and skills to install machine components (needles, cams, sinkers and cylinders) and to perform cleanliness, oiling and greasing of machine parts. Occupational health and safety precautions relevant with this module have also been covered.

Duration: 170 hours **Theory:** 30hours **Practice:** 140hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1. **Replace Needles, Cams and Sinkers of the Knitting Machines**	**Trainee will be able to:** • Select appropriate tools and equipment to replace and install needles, cams, cylinder and sinkers. • Replace and install needles, cams and sinkers of the machine according to manufacturer's instructions. • Identify problems in machine parts and report to supervisor for appropriate action. • Maintain record of	• Tools and equipment for replacing and installing needles, cams, cylinder and sinkers. • Functions and types of needles, cams, cylinder and sinkers in knitting machine. • Defects and problems faced during knitting operations regarding needles, cams, cylinder and sinkers. • Procedure of installing needles, cams, cylinder and	**Total:** 110 Hrs **Theory:** 20 Hrs **Practical:** 90 Hrs	**Non-Consumables:** • Tool Kit • Computer with internet • White board **Consumables:** • Needles • Cams • Sinkers • Feeders • Note book • Pencil Eraser Sharpener • Whiteboard Marker	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	replacement of machine parts. • Observe occupational health and safety precautions at all times to work.	sinkers of knitting machine. • Reasons of needle breakage. • Importance of replacement records of machine parts. • Safety precautions during installing different machine parts.			
LU-2. **Clean Machine Components**	**Trainee will be able to:** • Identify the machine component which requires cleanliness. • Select tools and materials required for cleaning of machine components. • Use appropriate method and technique to clean the machine components. • Maintain log book of cleaning of machine parts in proper order.	• Cleaning of main machine, cam box, cylinder, sinkers etc. • Use of L-key, screw driver, hammer, plair, wrench, air pressure, white oil, kerosene oil, and cut pieces of fabric. • Method of maintaining log book for cleaning procedures.	**Total:** 24 Hrs **Theory:** 4 Hrs **Practical:** 20hrs	**Non-Consumables:** • Tool Kit • Computer with internet • White Board **Consumables:** • Fabric Cut Pieces • Lubricants • Log Book • Note book • Pencil Eraser Sharpener • Whiteboard Marker	**Theory:** Class Room **Practical:** Workplace/ Lab
LU-3.	**Trainee will be able to:**		**Total:**	**Non-**	**Theory:**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
Perform Oiling of Machine Components	• Identify the machine component which requires oiling. • Select tools and materials required for oiling of machine components. • Use appropriate method and technique to oil the machine components. • Maintain log book of oiling procedures of machine parts in proper order.	• Oiling of needle, cylinder, cam box, sinker and feeder. • Use of L-key, screw driver, hammer, plair, wrench, air pressure, white oil, kerosene oil, and cut pieces of fabric. • Method of maintaining log book for oiling procedures. • OHS (overall health & Safety) precautions.	24 Hrs **Theory:** 4 Hrs **Practical:** 20 hrs	**Consumables:** • Tool Kit • Computer with Internet • White Board **Consumables:** • Fabric Cut Pieces • Lubricants • Log Book • Note book • Pencil Eraser Sharpener • Whiteboard Marker	Class Room **Practical:** Workplace/Lab
LU-4 **Perform Greasing of Machine Components**	**Trainee will be able to:** • Identify the machine component which requires greasing. • Select tools and materials required for greasing of machine components. • Use appropriate method and technique to grease the machine components. • Maintain log book of	• Greasing of bearing, main bed, and main shaft. • Use of L-key, screw driver, hammer, plair, wrench, grease, and cut pieces of fabric. • Method of maintaining log book for grease procedures. • OHS (overall health &	**Total:** 12 Hrs **Theory:** 2 Hrs **Practical:** 10hrs	**Non-Consumables:** • Tool Kit • Computer with Internet • Whiteboard **Consumables:** • Fabric Cut Pieces • Lubricants • Log Book • Note book	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	greasing procedures of machine parts in proper order.	Safety) precautions.		• Pencil Eraser Sharpener • Whiteboard Marker	

3.5 Module 5: DEVELOP PROFESSIONALISM

Objective of the Module: This module is designed to differentiate professionalism and being professional. This way of being is made up of appearance, manner, communication, interacting, attitudes, approach, skills and openness to grow. Professionalism is a combination of taught aspects, like knowledge and skills, and learning gained through experience.

Duration: 58 hours **Theory:** 17hours **Practice:** 41hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1.Communicate with Co-Workers	**Trainee will be able to:** • Communicate within a department. • Communication with other departments. • Dealing with vendors. • Interaction with other organisations. • Using various media to communicate effectively.	• Identify factors required to communicate effectively and precisely within same organisation. • Explain elements required to deal with vendors and other organisations. • Justify the appropriate use of electronic and relative media as per need	**Total:** 9 Hrs **Theory:** 3 Hrs **Practical:** 6 hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:** • Note book • Board markers • Pencil • Eraser • Sharpener	**Theory:** Class Room **Practical:** Workplace/Lab
LU-2 **Manage Time**	**Trainee will be able to:** • Manage time to complete the assigned work. • Manage workload as per task.	• Identify the importance of time division and allocation according to task priorities, involving management and co-workers	**Total:** 3 Hrs **Theory:** 3 Hrs	**Non-Consumables:** • Computer with internet • Projector • White board	**Theory:** Class Room **Practical:**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	• Meet the specific deadlines. • Handle time division with co-workers.		**Practical:** 0 hrs	**Consumables:** • Note book • Board markers • Pencil • Eraser • Sharpener	Workplace/Lab
LU-3. **Upgrade Skills**	**Trainee will be able to:** • Participate in Skill test. • Attend seminars /workshops. • Involve in competitions time to time. • Perform market research. • Analyse upcoming market trends.	• Describe the importance of trends and market research. • Identify the need of skills set by getting involved in seminars, workshops and competitions.	**Total:** 23 Hrs **Theory:** 3 Hrs **Practical:** 20 hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:** • Board markers • Notebook • Pencil • Eraser • Sharpener	**Theory:** Class Room **Practical:** Workplace/Lab
LU-4 **Keep the workplace clean**	**Trainee will be able to:** • Keep their workplace organised. • Ensure clean working environment	• Describe the importance of clean and organised workplace	**Total:** 10 Hrs **Theory:** 3 Hrs **Practical:** 7 hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:**	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				• Notebook • Pencil • Eraser • Sharpener • White Board Marker	
LU-5 **Work in a team**	**Trainee will be able to** • Demonstrate good team skills. • Carry an appropriate appearance. • Show comfort and tolerance. • Present and observe good work ethics	• Identify the importance of being a good team player.	**Total:** 3 Hrs **Theory:** 3 Hrs **Practical:** 0 Hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:** • Note book • Board markers	**Theory:** Class Room **Practical:** Workplace/Lab
LU-6. **Ensure Health and Safety**	**Trainee will be able to** • Store all flammables in proper safe place • Ensure the proper ventilation of the workplace • Check Pattern drums and pattern wheels totally guarded • Make sure Isolation equipment fitted according	• Identify the materials which can catch fire • Recognise emergency situations • Define the importance of following operating given instructions for using tools • Identify the precautionary	**Total:** 10 Hrs **Theory:** 2Hrs **Practical:** 8hrs	**Non-Consumables:** • Computer with internet • Projector • White board **Consumables:** • Note book • Board markers	**Theory:** Class Room **Practical:** Workplace/Lab

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	to manufacturer's instructions • Fit Positive feed drive belts with a suitable guard according to given instructions • Fit Inching buttons to all machines and readily distinguishable by touch • Check Guards are fitted on hose machines where a full cabinet base is not provided • Check Drip trays are provided for each machine • Make sure Gantry systems of yarn support guarded • Confirm Emergency stop buttons are immediately accessible and identifiable • Check Creeling operations - musculoskeletal strains and RSI aspects of long term hand or arm movements reduced as	measures to be followed during machine operations • Specify the precautionary measures to be followed during the removal of fabric from machine		• Pencil • Eraser Sharpener	

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	much as possible • Make sure Safe systems of work for access for threading of yarn are working properly • Check Safe system of work for removal of rolls or layers of fabric • Verify Half hose and sock machines – safe system of removing product from the bin • Press offs - wire hook only inserted when machine is stationary • Ensure Machine handle always left at rest before machine is started • Verify Safe system of work in place to prevent operators wearing loose clothing, jewellery, long hair and unsuitable footwear				

4. ASSESSMENT GUIDE:

Good assessment practices should be adopted for Sessional and Final assessments. Such practices by vocational training providers during Sessional and final assessments will form the basis of qualifying the trainees.

4.1 Differences between Sessional and Final Assessments:

Sessional assessment shall be conducted at any time while the course is being delivered to the students. Its purpose is to provide feedback:

- To the student: Identifying achievement and areas for further teaching and its level.
- To the teacher: Evaluating the effectiveness of teaching, and guide to determine the future plan.

Assessors need to devise Sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy.

Final assessment is the assessment, usually carried out on completion of a course or module. 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 often fairly 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.

Methods will include direct assessment, as the most desirable form of assessment. For this, evidence shall be obtained by directly observing the student's performance.

Examples for direct assessment of Knitting Machine Operator will include:

- Work performances, for example Knit fabrics with different types of machines
- Demonstrations, for example demonstrating the procedure of making knit fabric etc
- Direct questioning, where the assessor will ask the student about different types of knitting machines
- Paper-based tests, such as multiple choice or short answer questions at entrepreneurship development, maintain record of processed articles, close workstation as per SOP etc

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

Examples for indirect assessment of knitting machine operator will include:

- Make knit fabric with different types of stitches as per sample.
- Set up machine according to design and maintain neatness.
- Installation of machines.
- Storage of tools, equipments and material, the methods adopted to store products.

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed).

4.3 Principles of assessment

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

Fairness means that each student should be assessed without any bias or injustice. For example, if any information about the task being done needs to be communicated, it should be communicated to all the students at the same time so that every students gets the same information.

Validity means that a valid assessment is carried out to assess a certain task. For example, if the ability to make knit fabric is to be assessed and certified, the assessment should involve performance criteria that are directly related to knit fabric making.

Reliability means that the assessment is consistent. For example, if the performance in making of knit fabrics and method adapted to make knit fabric 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 modify the arrangements to accommodate the students' needs.

4.4 Assessment strategy for the knitting machine operator Curriculum

This curriculum consists of 05 modules

Module-1: Introduction to Knitting
Module-2: Setting up Knitting Machine according to Work Specifications
Module-3: Carrying Out Knitting Operations
Module-4: Carrying Out Repair and Maintenance of Knitting Machines
Module-5: Develop Professionalism

4.5 Suggestions for Sessional assessment

The Sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The Sessional marks shall contribute to the final qualification. Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions. For practical assessment, all procedures and methods for the modules must be assessed on a Sessional basis. Guidance is provided under the title planning for assessment.

4.6 Suggestions of final assessment

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification. The final theoretical assessment shall consist of multiple choice and short answer questions, covering all modules. For practical assessment, the method of making fabrics on knitting machine shall be selected to assess the competencies of student expected to be gained after this training course. It is also proposed that the assessment may take place in such a way that covers each of the modules. Time and markings may be distributed according to the importance of module that is reflected from the time invested during teaching.

Modules	Distribution of time and markings for assessment		
	Total	Out of total hrs / markings	Practical
MODULE 1	20 %	4%	16%
MODULE 2	30 %	6%	24%
MODULE 3	30 %	6%	24%
MODULE 4	10 %	2%	8%

MODULE 5	10%	2%	8%
Total	**100%**	**20**	**80**

Few examples that examiner may use for the assessment are given below:

MODULE 1: **Introduction to Knitting**	**PRACTICAL**	**THEORY**
LU-1: **Basics of knitting**	**Trainee will be able to:** • Identify different knitted products. • Recognize different parts of knitting machines. • Classify different types of knitting machines commonly using in knitting industry.	**Trainees will be asked for:** • Definition of knitting • Importance of knitting and knitted products. • Parts of Knitting Machine • Types of Knitting Machines:
LU-2 **Techniques of knitting and knit stitch types**	**Trainee will be able to:** • Identify different knitting techniques • Perform different knitting techniques with hands • Perform different types of knit stitches.	**Trainees will be asked for:** • Different techniques of Knitting • Different types of Knit Stitches
LU-3 **Historical perspective of**	**Trainee will be able to:**	**Trainees will be asked for:** • Early Origins of Knitting

MODULE 1: Introduction to Knitting	PRACTICAL	THEORY
knitting		• Industrial revolution • Early 21st Century
LU-4 **Current innovations of knitting**	**Trainee will be able to:** • Identify seamless products. • Identify fusion of float plating technology with other materials. • Differentiate technical textiles with other textiles.	**Trainees will be asked for:** • Different innovations happening all over the world in knitting industry. • Latest developments in knitting industry. • Seamless Technology • Float Plating Technology • Technical Textiles

MODULE 2: Setting up Knitting Machine According to Work Specifications	PRACTICAL	THEORY
LU-1 **Arrange Raw Material for Knitting Operations**	**Trainee will be able to:** • Receive and interpret work order correctly. • Prepare and send demand requisition to store department for issuance of raw material. • Check the demand requisition is prepared correctly in terms of type, quantity and quality of raw material and is in accordance to work order. • Store the material according to type and category.	**Trainees will be asked for:** • Types of raw materials used in knitting operations • Quality of different types of yarn like cotton, wool, nylon, polyester, acrylic, polypropylene, viscose & other different types of yarns blends • Difference in greiege& yarn dyed yarns. • Different properties of yarns including strength, abrasion resistance. • Concept of stitch gauge & GSM. • Work orders including internal purchase orders. • Method of preparing demand requisition for arranging raw material. • Method of storing raw material according to types of yarns as per desired design, production plan etcand category of yarns as per production plan.

MODULE 2: Setting up Knitting Machine According to Work Specifications	PRACTICAL	THEORY
LU-2 **Prepare Machine for Knitting**	**Trainee will be able to:** • Receive and interpret work specifications from supervisor. • Check, replace and install needles in the knitting machine according to work specifications. • Carry out yarn batching according to work specifications. • Follow proper procedure for loading yarn into knitting machine. • Apply occupational health and safety at all times	**Trainees will be asked for:** • Different types of knitting machines & overview of knitting machines like circular, flatbed, jacquard etc • Method of installing needles in the knitting machine. • Method of yarn batching. • Procedure of joining and knotting of yarn. • Importance of wearing Personal Protective Equipment (PPEs). • Occupational health and safety risks involved in knitting operations. • Machine settings including electronic, automated & mechanical.

MODULE 3: Carrying Out Knitting Operations	PRACTICAL	THEORY
LU-1 **Communicate Operational Information to Co-workers**	**Trainee will be able to:** • Maintain records and prepare production reports. • Document adjustments tomachine and discus withappropriate person. • Record operational instructions on every step. • Pass on received information to co-workers for smooth knitting operations.	**Trainees will be asked for:** • General workplace practices. • Principles and method of communications including verbal & written. • Method of preparing production reports in consultation with production department & immediate supervisor. • Factors affecting machine performance like yarn strength, sizing, ambient conditions. • Knitting methods and techniques. • Occupational health and safety precautions
LU-2 **Feed Yarn into Knitting Machine**	**Trainee will be able to:** • Load yarn into knitting creels according to production plan. • Use appropriate method to perform knotting of yarn into feeders. • Apply occupational health and safety precautions at all times to work.	**Trainees will be asked for:** • Functions of machine parts such as cams, needles, sinkers and feeders of different types of knitting machines. • Technique of yarn knotting. • Procedure of loading yarn into knitting creels. • Occupational health and safety precautions involved in feeding yarn into knitting machine

MODULE 3: Carrying Out Knitting Operations	PRACTICAL	THEORY
LU-3 **Produce Knitted Fabric according to Work Specifications**	**Trainee will be able to:** • Produce sample and match it with the sample provided by the client after initial check of machine by the supervisor. • Start production after approval from supervisor. • Monitor knitting machine operation to detect faults and problems during production. • Fix minor problems (e.g. machine and fabric related) during operations and report to appropriate person in case of major problems. • Use appropriate method and technique to cut roll after required weightage. • Inspect fabric using fabric inspection table to check minor defects in the roll. • Apply occupational health and safety precautions at all times to work. • Follow work and production schedules as communicated by the supervisor.	**Trainees will be asked for:** • Fabric quality and checking parameters. • Technique of fabric roll cutting. • Matching specifications of samples received from client with the sample produced. • Pantone matching, grey card etc. • Fabric structure. • Minor and major problems • Trouble shooting of minor problems. • Occupational health and safety precautions required to be observed during production. • Quality parameters to be observed during monitoring of knitting operations. • Understanding of different types of quality scaling systems. • Method of fabric inspection/quality checking.

MODULE 4: Carrying Out Repair and Maintenance of Knitting Machines	PRACTICAL	THEORY
LU-1 **Replace Needles, Cams and Sinkers of the Knitting Machines**	**Trainee will be able to:** • Select appropriate tools and equipment to replace and install needles, cams, cylinder and sinkers. • Replace and install needles, cams and sinkers of the machine according to manufacturer's instructions. • Identify problems in machine parts and report to supervisor for appropriate action. • Maintain record of replacement of machine parts. • Apply occupational health and safety precautions at all times to work.	**Trainees will be asked for:** • Tools and equipment for replacing and installing needles, cams, cylinder and sinkers. • Functions and types of needles, cams, cylinder and sinkers in knitting machine. • Defects and problems faced during knitting operations regarding needles, cams, cylinder and sinkers. • Procedure of installing needles, cams, cylinder and sinkers of knitting machine. • Reasons of needle breakage. • Importance of record of replacement of machine parts. • Safety precautions to be followed during installing needles, cams, cylinder and sinkers.
LU-2 **Clean Machine Components**	**Trainee will be able to:** • Identify the machine component which requires cleanliness.	**Trainees will be asked for:** • Cleaning of main machine, cam box, cylinder, sinkers etc.

MODULE 4: Carrying Out Repair and Maintenance of Knitting Machines	PRACTICAL	THEORY
	• Select tools and materials required for cleaning of machine components. • Use appropriate method and technique to clean the machine components. • Maintain log book of cleaning of machine parts in proper order.	• Use of L-key, screw driver, hammer, plair, wrench, air pressure, white oil, kerosene oil, and cut pieces of fabric. • Method of maintaining log book for cleaning procedures.
LU-3 **Perform Oiling of Machine Components**	**Trainee will be able to:** • Identify the machine component which requires oiling. • Select tools and materials required for oiling of machine components. • Use appropriate method and technique to oil the machine components. • Maintain log book of oiling procedures of machine parts in proper order.	**Trainees will be asked for:** • Oiling of needle, cylinder, cam box, sinker and feeder. • Use of L-key, screw driver, hammer, plair, wrench, air pressure, white oil, kerosene oil, and cut pieces of fabric. • Importance of maintaining log book for oiling procedures. • OHS precautions.
LU-4 **Perform Greasing of Machine Components**	**Trainee will be able to:** • Identify the machine component which requires greasing. • Select tools and materials required for greasing of machine components. • Use appropriate method and technique to grease the machine components.	**Trainees will be asked for:** • Greasing of bearing, main bed, and main shaft. • Use of L-key, screw driver, hammer, plair, wrench, grease, and cut pieces of fabric. • Importance of maintaining log book for

MODULE 4: Carrying Out Repair and Maintenance of Knitting Machines	PRACTICAL	THEORY
	• Maintain log book of greasing procedures of machine parts in proper order.	grease procedures. • OHS precautions.

MODULE 5: Develop Professionalism	PRACTICAL	THEORY
LU-1 **Communicate with Co-Workers**	**Trainee will be able to:** • Communicate within a department. • Communication with other departments. • Dealing with vendors. • Interaction with other organisations. • Using various media to communicate effectively	**Trainees will be asked for:** • Factors required to communicate effectively and precisely within same organisation. • Elements required to deal with vendors and the other organisations. • Appropriate use of electronic and relative media as per need
LU-2 **Manage Time**	**Trainee will be able to:** • Manage time to complete the assigned work. • Manage workload as per task. • Meet the specific deadlines. • Handle time division with co-workers.	**Trainees will be asked for:** • Importance of time division and allocation according to task priorities, involving management and co-workers
LU-3 **Upgrade Skills**	**Trainee will be able to:** • Participate in Skill test. • Attend seminars /workshops. • Involve in competitions time to time. • Perform market research. • Analyse upcoming market trends.	**Trainees will be asked for:** • Importance of trends and market research. • Need of skills sets by getting involved in seminars, workshops and competitions.
LU-4 **Keep the workplace clean**	**Trainee will be able to:** • Keep their workplace organised.	**Trainees will be asked for:** • Importance of clean and organised

MODULE 5: Develop Professionalism	PRACTICAL	THEORY
	• Ensure clean working environment	workplace
LU-5 **Work in a team**	**Trainee will be able to:** • Demonstrate good team skills. • Carry an appropriate appearance. • Show comfort and tolerance. • Present and observe good work ethics	**Trainees will be asked for:** • Importance of being a good team player.
LU-6 **Ensure Health and Safety**	**Trainee will be able to:** • Store all flammables in proper safe place • Ensure the proper ventilation of the workplace • Check Pattern drums and pattern wheels totally guarded • Fit Positive feed drive belts with a suitable guard according to given instructions • Fit Inching buttons to all machines and readily distinguishable by touch • Check Guards are fitted on hose machines where a full cabinet base is not provided • Check Drip trays are provided for each machine • Confirm Emergency stop buttons are immediately accessible and identifiable	**Trainees will be asked for:** • Materials which can caught fire • Emergency situations • Importance of following operating instructions given for tools

MODULE 5: Develop Professionalism	PRACTICAL	THEORY
	• Check Creeling operations • Make sure Safe systems of work for access for threading of yarn are working properly • Check Safe system of work for removal of rolls or layers of fabric • Verify Half hose and sock machines – safe system of work for removing work from the bin • Press offs - wire hook only inserted when machine is stationary • Machine handle always left at rest before machine is started • Verify Safe system of work in place to prevent operators wearing loose clothing, jewellery, long hair and unsuitable footwear	

5. LIST OF TOOLS AND EQUIPMENT

(For a class of 20 students)

Documents, Policies and guidelines

Total no. Of students = 25

Tools and Equipment (Non-consumables)	Quantity
Circular Knitting Machine	1
Flat Bed Machines	10
Fabric Inspection Table	2
Fabric Cutter for GSM	2
Weighing Scale	2
Yarn Rate Testing Meter	2
Yarn Tension Meter	2
V-Belt Flat machine	2
Jacquard Machine	2
Hand Circular Knit Machine	2
Tool Box	10
White Board	1

Computer	**10**
Internet Connection	**1**
Projector	**1**
Hand knit needles in different nos	**25**
Scales	**25**
Indicator Meter	**2**
Air compressor	**2**
Clipper	**25**
Yarn Trolley	**2**
Pantone Books	**2**
Grey Cards	**2**
Pick Glass	**25**

7. List of consumables

- Creel
- Feeder
- Needle
- Needle Detector
- Needle Track
- Sinkers
- Sinkers Ring
- VDQ Pulley
- Pulley Belt
- Tension Disk
- Yarn Guide
- Sensor
- Cylinder
- Cylinder Balance
- Spreader
- Fixation Feeder
- Inlet & Outlet Stop Motion
- MPF Wheel MPF i.e. Mamenger Positive Feed
- Feeder Ring
- Disk Drum
- Pattern Wheel
- Cam Box
- Cam
- Lycra Attachment Device
- Lycra Stop Motion
- Uni-wave Lubrication
- Adjustable Fan
- Expander
- Air Gun Nozzle
- Beads
- Note Books
- Board Markers
- Scissors
- Different types of yarns
- Plastic Sheets
- Safety Masks
- Job Order Formats
- Work Order Formats
- Log Book
- Lubricants & oil
- Fabric cut pieces

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