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MINISTRY OF LABOR AND SKILLS

Textile Processing Technology
LEVEL – II

TVET CURRICULUM
Based on February, 2022 (V- I) Occupational standard (OS)

March, 2022
Addis Abeba, Ethiopia

Preface

The reformed TVET-System is an outcome-based system. It utilizes the needs of the labor market and occupational requirements from the world of work as the benchmark and standard for TVET delivery. The requirements from the world of work are analyzed and documented – taking into account international benchmarking – as occupational standards (OS).

In the reformed TVET-System, curricula and curriculum development play an important role with regard to quality driven comparable TVET-Delivery. The Curricula help to facilitate the training process in a way, that trainees acquire the set of occupational competences (skills, knowledge and attitude) required at the working place and defined in the occupational standards (OS).

This curriculum has been developed by a group of professional experts from different Regional TVET Bureaus, colleges, Industries, Institutes and universities based on the occupational standard for Textile Processing technology Level II**.**

The curriculum development process has been actively supported and facilitated by **Ministry of Labor and Skills.**

TVET-Program Design

1.1. TVET-Program Title: Textile Processing Technology Level II

1.2. TVET-Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the trainees to the standard required by the occupation. The contents of this program are in line with the occupational standard. The Trainees who successfully completed the Program will be qualified to work as a **Textile Processor** with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the **Industry** sector in the field of **Textile Processing Technology.**

The prime objective of this training program is to equip the Trainees with the identified competences specified in the OS. Graduates are therefore expected to_Weigh and Check Textile chemical processing inputs, Perform pretreatment operations, Perform dyeing operations, Perform printing operations, Perform final finishing operations, Perform final inspection and packaging of finished Textiles, Use Specialized Machinery to Assist Textile processing Production, Perform online process quality control and Prevent and Eliminate MUDA in accordance with the performance criteria and evidence guide described in the OS.

1.3. TVET-Program Training Outcomes

The expected outputs of this program are the acquisition and implementation of the following units of competences:

IND TPT2 01 1221 Weigh and Check Textile chemical processing inputs
IND TPT2 02 1221 Perform pretreatment operations
IND TPT2 03 1221 Perform dyeing operations.
IND TPT2 04 1221 Perform printing operations
IND TPT2 05 1221 Perform final finishing operations
IND TPT2 06 1221 Perform final inspection and packaging of finished Textiles
IND TPT2 07 1221 Use Specialized Machinery to Assist Textile processing Production
IND TPT2 08 1221 Perform online process quality control
IND TPT2 09 1221 Prevent and Eliminate MUDA

1.4. Duration of the TVET-Program

The Program will have duration of **686 hours** including the on school/ Institution training and on-the-job practice or cooperative training time. Such cooperative training based on realities of the industry, nature of the occupation, location of the TVET institution, and other

factors will be considered in the training delivery to ensure that trainees acquire practical and workplace experience.

s.no	Unit competency	TVET Institution training		Cooperative training	Total hours	Remarks
		Theory	Practical			
1.	Prevent and Eliminate MUDA	30	15	20	**65**	
2.	Weighing and Checking Textile chemical processing inputs.	15	25	30	**70**	
3.	Performing Pretreatment Operations.	24	26	40	**90**	
4.	Perform dyeing operations	20	40	20	**80**	
5.	Perform Printing Operations	20	40	20	**80**	
6.	Perform final finishing operations	44	12	35	**91**	
7.	Perform final inspection and packaging of finished Textiles	30	20	10	**60**	
8.	Using Specialized Machinery to Assist Textile processing Production	40	-	30	**70**	
9.	Performing online process quality control	30	20	30	**80**	
	Total	253	50	235	**686**	

1.4 Qualification Level and Certification

Based on the descriptors elaborated on the Ethiopian National TVET Qualification Framework (NTQF) the qualification of this specific TVET Program is Level II**.**

The trainee can exit after successfully completing the modules in one level and will be awarded the equivalent institutional certificate on the level completed. However, only institutional certificate of training accomplishment will be awarded.

1.5. Target Groups

Any citizen **without disability** who meets the entry requirements under items 1.7 and capable of participating in the training activities is entitled to take part in the Program.

1.7 Entry Requirements

The prospective participants of this program are required to possess the requirements or directive of the **Ministry of Labor and Skills**.

1.8 Mode of Delivery

This TVET-Program is characterized as a formal Program on middle level technical skills. The mode of delivery is co-operative training. The time spent by the trainees in the real work place/ industry will give them enough exposure to the actual world of work and enable them to get hands-on experience.

The co-operative approach will be supported with school-based lecture-discussion, simulation and actual practice. These modalities will be utilized before the trainees are exposed to the industry environment.

Hence based on the nature of the occupation, location of the TVET institutions, and interest of the industry alternative mode of cooperative training such as apprenticeships, internship and traineeship will be employed. In addition, in the areas where industry is not sufficiently available the established production and service centers/learning factories in TVET institutions will be used as cooperative training places. The Training-Institution and identified companies have forged an agreement to co-operate with regard to the implementation of this program.

1.9. TVET-Program Structure

Unit of Competence		Module Code & Title		Training Outcomes	Duration (In Hours)
IND TPT2 09 1221	Prevent and Eliminate MUDA	IND TPT2 M01 0222	Preventing and Eliminating MUDA	▪ Prepare for work. ▪ Identify MUDA and problem ▪ Analyze causes of a problem. ▪ Eliminate MUDA and Assess effectiveness of the solution. ▪ Prevent occurrence of wastes and sustain operation.	**65**
IND TPT2 01 1221	Weigh and Check Textile chemical processing inputs.	IND TPT2 M02 0222	Weighing and Checking Textile chemical processing inputs.	▪ Determine job requirements ▪ Prepare for weighing ▪ Weigh textile chemical processing inputs ▪ Check textile chemical processing inputs ▪ Confirm documentation	**70**
IND TPT2 02 1221	Perform pretreatment operations	IND TPT2 M03 0222	Performing pretreatment operations	▪ Determine job requirements ▪ Understand Pre-treatment processes ▪ Set up and load pre-treatment machines and equipment ▪ Operate and monitor pre-treatment equipment ▪ Remove product and dispatch	**90**
IND TPT2 03 1221	Perform dyeing operations.	IND TPT2 M04 0222	Performing dyeing operations.	▪ Determine job requirements ▪ Understand Dyeing processes ▪ Set up and load machine ▪ Operate and monitor dyeing machine ▪ Complete dyeing operations ▪ Check dye outcomes	

IND TPT2 04 1221	Perform printing operations	IND TPT2 M05 0222	Performing printing operations	▪ Determine job requirements ▪ Understand Printing processes ▪ Set up and load machine ▪ Operate and monitor printing machine ▪ Complete printing operations	
IND TPT2 05 1221	Perform final finishing operations	IND TPT2 M06 0222	Performing final finishing operations	▪ Determine job requirements ▪ Understand Finishing processes ▪ Set up and load finishing machine or equipment ▪ Operate and monitor finishing machines or equipment ▪ Remove product and dispatch ▪ Finishing machines ▪ Complete records	**91**
IND TPT2 06 1221	Perform final inspection and packaging of finished Textiles.	IND TPT2 M07 0222	Performing final inspection and packaging of finished Textiles.	▪ Determine job requirements ▪ Prepare work pieces and workstation ▪ Operating, inspection and packaging tasks ▪ Dispatch completed work	**60**
IND TPT2 07 1221	Use Specialized Machinery to Assist Textile processing Production	IND TPT2 M08 0222	Using Specialized Machinery to Assist Textile processing Production	▪ Determine job requirements ▪ Prepare for specialized machine operation ▪ Operate specialized machine ▪ Dispatch completed work	**70**
IND TPT2 08 1221	Perform online process quality control	IND TPT2 M09 0222	Performing online process quality control	▪ Determine job requirements ▪ Prepare for test ▪ Perform on line process test ▪ Record and report result	**80**

*The time duration (Hours) indicated for the module should include all activities in and out of the TVET institution.

1.10 Institutional Assessment

Two types of evaluation will be used in determining the extent to which training outcomes are achieved. The specific training outcomes are stated in the modules. In assessing them, verifiable and observable indicators and standards shall be used.

The ***formative assessment*** is incorporated in the training modules and form part of the training process. Formative evaluation provides the trainee with feedback regarding success or failure in attaining training outcomes. It identifies the specific training errors that need to be corrected, and provides reinforcement for successful performance as well. For the teacher, formative evaluation provides information for making instruction and remedial work more effective.

Summative Evaluation the other form of evaluation is given when all the modules in the program have been accomplished. It determines the extent to which competence have been achieved. And, the result of this assessment decision shall be expressed in the term of institutional Assessment implementation guidelines..

Techniques or tools for obtaining information about trainees' achievement include oral or written test, demonstration and on-site observation.

1.11 TVET Teachers Profile

The teachers conducting this particular TVET Program are B - Level and above who have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE - 01
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE : **Preventing and Eliminating MUDA**
MODULE CODE: **IND TPT2 M01 0222**
NOMINAL DURATION: **65Hours**

MODULE DESCRIPTION:

This module covers the knowledge, skills and attitude required by a worker to prevent and eliminate MUDA/wastes in his/her workplace by applying scientific problem-solving techniques and tools to enhance quality, productivity and other kaizen elements on continual basis. It covers responsibility for the day-to-day operation of the work and ensures Kaizen Elements are continuously improved and institutionalized.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Prepare for work.

LO2. Identify MUDA and problem

LO3. Analyze causes of a problem**.**

LO4. Eliminate MUDA and Assess effectiveness of the solution.

LO5. Prevent occurrence of wastes and sustain operation.

MODULE CONTENTS:

LO1. Prepare for work.

1.1. Using work instructions

1.2. Reading and interpreting job specifications

1.3. Observing OHS requirements

1.4. Selecting work material

1.5. Identifying and checking safety equipment and tools

LO2. Identify MUDA and problem

2.1 Preparing and implementing MUDA’s and problem identification plan

2.2 Discussing MUDA’s causes and effects

2.3 Problem’s statistical tools and techniques

2.3.1 7QC tools

2.3.2 QC techniques

2.4 Identifying and listing kaizen problem’s on Kaizen Board

2.5 Current work place analyzing tools and techniques

2.6 Wastes/MUDA's identification and measuring procedures

2.7 Reporting identified and measured wastes

LO3. Analyze causes of a problem.

3.1 Listing problem's causes

3.2 Analyzing cause relationships using 4M1E

3.3 Selecting problem's root cause

3.4 Listing problem's solving ways

3.5 Testing and evaluating problem solutions

3.6 Preparing solution's action plan

LO4. Eliminate MUDA and Assess effectiveness of the solution.

4.1 Preparing and implementing MUDA's elimination plan by medium KPT members

4.2 Adopting ten basic improvement principles

4.3 MUDA eliminating tools and techniques

4.4 Reducing and eliminating wastes/MUDA

4.5 Identifying tangible and intangible results

4.6 Comparing tangible results with targets

4.6 Reporting improvements gained

LO5. Prevent occurrence of wastes and sustain operation.

5.1 Preparing and implementing MUDA's prevention plan

5.2 Preparing and discussing machines and operations standards

5.3 Preventing wastes/MUDA using visual and auditory control methods

5.4 Creating waste-free workplace using 5W and 1Hsheet

5.5 Doing and completing operations

5.6 Facilitating the updating of standard procedures and practices

5.7 Training and ensuring work team capability on new SOPs

Learning Methods:
▪ Lecture and Discussion ▪ Démonstration ▪ Simulation ▪ Role playing
Assessment Methods:
▪ Written test ▪ Oral questioning ▪ Practical demonstration

ASSESSMENT CRITERIA:

LO1. Prepare for work.

- Work instructions are used to determine job requirements, including method, material and equipment.
- Job specifications are read and interpreted following working manual.
- OHS requirements, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.
- Appropriate material is selected for work.
- Safety equipment and tools are identified and checked for safe and effective operation.

LO2. Identify MUDA and problem

- Plan of MUDA and problem identification is prepared and implemented.
- Causes and effects of MUDA are discussed.
- All possible problems related to the process /Kaizen elements are listed using statistical tools and techniques.
- All possible problems related to kaizen elements are identified and listed on Visual Management Board/Kaizen Board.
- Tools and techniques are used to draw and analyze current situation of the work place.
- Wastes/MUDA are identified and measured based on relevant procedures.
- Identified and measured wastes are reported to relevant personnel.

LO3. Analyze causes of a problem.

- All possible causes of a problem are listed.
- Cause relationships are analyzed using4M1E.
- Causes of the problems are identified.
- The root cause which is most directly related to the problem is selected.
- All possible ways are listed using creative idea generation to eliminate the most critical root cause.
- The suggested solutions are carefully tested and evaluated for potential complications.
- Detailed summaries of the action plan are prepared to implement the suggested solution.

LO4. Eliminate MUDA and Assess effectiveness of the solution.

- Plan of MUDA elimination is prepared and implemented by medium KPT members.
- Necessary attitude and the ten basic principles for improvement are adopted to eliminate waste/MUDA.
- Tools and techniques are used to eliminate wastes/MUDA based on the procedures and

OHS.

- Wastes/MUDA are reduced and eliminated in accordance with OHS and organizational requirements.
- Tangible and intangible results are identified.
- Tangible results are compared with targets using various types of diagrams.
- Improvements gained by elimination of waste/MUDA are reported to relevant bodies.

LO5. Prevent occurrence of wastes and sustain operation.

- Plan of MUDA prevention is prepared and implemented.
- Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement are discussed and prepared.
- Occurrences of wastes/MUDA are prevented by using visual and auditory control methods.
- Waste-free workplace is created using 5W and 1Hsheet.
- The completion of required operation is done in accordance with standard procedures and practices.
- The updating of standard procedures and practices is facilitated.
- The capability of the work team that aligns with the requirements of the procedure is ensured and trained on the new Standard Operating Procedures (SOPs).

Annex: Resource Requirements

IND TPT2 M01 0222: Preventing and Eliminating MUDA				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	TTLM	Containing: Learning guide, teachers guide and Assessment Packet	1 pcs	1:25
B.	**Learning Facilities & Infrastructure**			
1.	Lecture Room	Area-7m*8m	1	1:25
2.	Library	Area- 30mX30m	1	1:25
C.	**Consumable Materials**			
1.	Paper	A4	1dusta	1:25
2	marker	Erasable or temporary marker	2	2:25
3	Paints	Metal paint green	1gallon	1:25
		Metal paint orange	1gallon	1:25
		Metal paint yellow	1gallon	1:25
D.	**Tools and Equipments**			
1	Cleaning broom	▪ Broomstick Material: Stainless Steel ▪ Material: PP+Stainless steel Pole+PET ▪ Broom Head Material: PP ▪ Dustpan Material: Plastic	5 pcs	1:5
2	Brush	▪ Bristle Material: pet polyester sharp tip filament ▪ Bristle Colour: white+brown ▪ Bristle Width: 100 mm Bristle ▪ Thickness: 20 mm ▪ Handle Material: maple wood ▪ Handle Colour: natural colour	3 pcs	3:25
3	Dust bin	▪ Entirely of stainless steel Structure.	3 pcs	3:25

		▪ Plastic inner bucket with handle for easy emptying ▪ Bottom base made of ABS ▪ Complete with pedal opening lid with shockproof protection		
4	Washing Detergent	▪ Detergent Type: Bleach ▪ Active ingredient content: 5%（Include）-15% ▪ Color: White ▪ Perfume: Flower Smell perfume Smell Feature: Disposable, Sustainable, Stocked	1 pcs	1:25
5	Gloves	▪ Material: Polyester + latex ▪ Function: anti- slip, abrasion resistance, Puncture Resistant ▪ Disposable: Non-disposable ▪ Outer materail: Latex Rubber ▪ Thickness: Flimsy	5 pcs	1:5
6	Bucket	▪ Capacity: 20liter ▪ Material: plastic ▪ Shape: Round	2 pcs	2:25

LEARNING MODULE- 02

TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**

MODULE TITLE : **Weighing and Checking Textile chemical processing inputs.**

MODULE CODE : **IND TPT2 M02 0222**

NOMINAL DURATION : **70 Hours**

MODULE DESCRIPTION :

This module covers the skills and knowledge to weigh and check textile chemical processing inputs such as textile materials, dyestuffs, chemicals and auxiliaries.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Determine job requirements

LO2. Prepare for weighing

LO3. Weigh textile chemical processing inputs

LO4. Check textile chemical processing inputs

LO5. Confirm documentation

MODULE CONTENTS:

LO1. Determine job requirements

1.1. standard operating procedures (SOPs)

1.2. Complying with work health and safety (WHS)

1.2.1. Hazard identification and control

1.2.2. Risk assessment

1.2.3. Implementation of risk reduction measures

1.3. Using personal protective equipment (PPE)

1.4. Identifying job requirements

LO2. Prepare for weighing

2.1. Identifying and taking fibres samples

2.2. Identifying and taking yarns samples

2.3. Identifying and taking fabrics samples

2.4. Identifying and taking dyestuffs samples

2.5. Identifying and taking chemicals and auxiliaries samples

2.6. Organizing weighing or measuring equipment.

2.7. Checking calibration

LO3. Weigh textile chemical processing inputs

3.1. Weighing Fibers

3.2. Weighing yarns

3.3. Weighing fabrics

3.4. Weighing dyestuffs

3.5. Weighing chemicals and auxiliaries

3.6. Recording and Documenting weights

LO4. Check textile chemical processing inputs

4.1 Checking inputs quality

4.2 Checking raw materials weight

LO5. Confirm documentation

5.1 Checking inputs documentation

Learning Methods:

- Lecture and Discussion
- Demonstration
- Simulation
- Individual Assignement

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Follow standard operating procedures (SOPs).
- Comply with work health and safety (WHS) requirements at all times.
- Use appropriate personal protective equipment (PPE) in accordance with SOPs.
- Identify job requirements from specifications, drawings, job sheets or work instructions.

LO2. Prepare for weighing

- Fibres, yarns, fabrics, dyestuffs, chemicals and auxiliaries to be weighed are identified and samples are taken.
- Appropriate weighing or measuring equipment is organized.
- Calibration is checked as required.

LO3. Weigh textile chemical processing inputs

- Fibers, yarns, fabrics, dyestuffs, chemicals and auxiliaries are weighed accurately.
- Weights are correctly recorded and documented.

LO4. Check textile chemical processing inputs

- Inputs are correctly checked for purity, color, blend etc., if appropriate.
- The weight of raw materials is checked against production order.

LO5. Confirm documentation

- Textile chemical processing inputs; weight, color, order details and others parameters are checked against relevant documentation.

Annex: Resource Requirements

IND TPT2 M02 0222: Weighing and Checking Textile chemical processing inputs.				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A. Learning Materials				
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet	1 pcs	1:25
2.	Reference Books			
2.1	Jose Cegarra and Punte, Dyeing of textile materials,	Texille, 1993	1 pcs	1:25
2.2	SK Karmakar, Chemical technology in the pretreatment process of textile materials,	Elsevier, 1999.	1 pcs	1:25
2.3	RB Chavan, Chemical processing of hand loom fabrics	1999	1 pcs	1:25
2.4	Charles Thomasino, Chemistry and technology of fabric preparation and finishing	NCSU, 1994	1 pcs	1:25
B.	**Learning Facilities & Infrastructure**			
1.	Lecture rooms	7m*8m	1	1:25
3.	Library	30m*30m	1	1:25
4	Work shop	Standard size	1	1:25
B. Consumable Materials				
1.	Yarn	Cotton, Wool, polyester, Nylon, Acrylic etc	1Kg	1:25
2	Fabrics	Knitted, Woven and Non-woven etc.	10 m	2:25
3	Dyes, chemicals and Auxiliaries			

4.	salt	Hardness: 150mg-400mg/ l Packing wt: 50Kg Color: White Grade: Industrial Type: Dyeing	1Kg	1:25
5.	Direct dye	Form: powder Solubility: soluble in water Solid content: 90 – 95% Usage: textile industry	1Kg	1:25
6.	Reactive dye	Form: powder PH 1% solution: 7.85 Solubility: 90^{o} c- 50g/l Solid content: 90 – 95% Usage: wool, nylon, cotton	1Kg	1:25
7.	Sulphur dye	Form: powder PH 1% solution: 10-11 T^{o}- 30 - 90^{o} moisture: 6% max Solid content: 90 – 95% Purity: 95 – 98% Usage: textile dye stuffs	1Kg	1:25
8.	Soda ash	Form: powder PH 1% solution: $\geq 12.5 \pm 1$ Water solubility: easily dissolve in water Solubility: $\geq$ 87% Stability: Anion Usage: textile dye stuffs	1Kg	1:25
C. Tools, equipment and machineries				
1.	Digital Weighing balance	Display type :(LCD) Capacity: 220 gm Pan size: 80mm, power supply: 12V Division: 0.0001g/0.1mg Wind glass	1 pcs	1:25
2.	Beaker	Capacity: 50 ml / Diameter: 4 cm / Height: 6cm 100 ml / 5cm / 7cm 250 ml / 6cm / 10cm	1 pcs	1:25

		500 ml	8cm	12cm		
3.	Pipet	Material: polystyrene Length: 348mm Capacity: 5ml			5 pcs	1:5
4.	Titrator	Water content: 0.1- 500mg H_2O Concentration:10mg/l – 100%H_2O Volume: 10 ml burette, discharge +-0.015mL, Repeatability +-0.005mL. Endpoint Detection: by polarized potential level detected with a twin platinum electrode.			1 pcs	1:25
5.	Spoon	Laboratory Spoon Spatula 150mm, stainless steel			5 pcs	1:5
6.	Thermometer	For kinematic viscosity Temperature range: 28.6 - 31.4℃ Length: 300 - 310mm Scale: 0.05℃ Immersion: Total immersion Material: Glass, mercury			5 pcs	1:5
7.	PH meter	Characteristics: value pH range: 0 to 14 pH pH Resolution: 0.01 pH pH Accuracy: 0.02pH T^O Range: -5.0 – 60.0 ^OC Response time: <=1minute			5 pcs	1:5

LEARNING MODULE - 03
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE : **Performing Pretreatment Operations.**
MODULE CODE: **IND TPT2 M03 0222**
NOMINAL DURATION : **90 Hours**

MODULE DESCRIPTION :

This module covers the knowledge, attitudes and skills required to conduct pretreatment of textile materials to make them ready for dyeing and printing operations.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Determine job requirements

LO2. Understand Pre-treatment processes

LO3. Set up and load pre-treatment machines and equipment

LO4. Operate and monitor pre-treatment equipment

LO5. Remove product and dispatch

MODULE CONTENTS:

LO1. Determine job requirements

1.1. Following standard operating procedures (SOPs)

1.2. Complying with work health and safety (WHS)

1.2.1 Hazard identification and control

1.2.2 Risk assessment

1.2.3 Implementation of risk reduction measures

1.3. Using appropriate personal protective equipment (PPE)

1.4. Identifying job requirements

LO2. Understand Pre-treatment processes

2.1. Understanding pretreatment processes,

2.2. Understanding pretreatment processes technologies

2.3. Understanding pretreatment processes significance

2.4. Understood interaction of Chemicals with each other & textiles

2.5. Identifying Chemicals & auxiliaries

2.6. Selecting chemical & auxiliaries

2.7. Preparing chemical recipe

LO3. Set up and load pre-treatment machines and equipment

3.1. Confirming textile product Pretreatment processes

3.1.1. Singeing

3.1.2. Desizing

3.1.3. Scouring; bleaching

3.1.4. Washing / drying

3.1.5. Mercerizing and heat setting

3.1.6. Carbonizing and degumming

3.2. Conforming textile product

3.2.1. Fibers

3.2.2. Yarns

3.2.3. Fabrics

3.3. Checking textile product specifications

3.4. Reporting non-conforming materials.

3.5. Loading textile product

LO4. Operate and monitor pre-treatment equipment

4.1. Undertaking pretreatment process & machines operation

4.2. Monitoring process

4.3. Checking product during and on completion

4.4. Identifying product faults

4.5. Identifying and correcting minor product process and machine faults

4.6. Reporting major product process and machine faults

LO5. Remove product and dispatch

5.1. Checking product quality standards

5.2. Unloading and dispatching Product

5.3. Completing documentation

Learning Methods:
• Lecture and Discussion • Demonstration • Simulation • Role playing
Assessment Methods:
• Written test • Oral questioning • Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Follow standard operating procedures (SOPs).
- Comply with work health and safety (WHS) requirements at all times.
- Use appropriate personal protective equipment (PPE) in accordance with SOPs.
- Identify job requirements from specifications, drawings, job sheets or work instructions.

LO2. Understand Pre-treatment processes

- Understand pretreatment processes, technologies and its significance.
- Interaction of Chemical s with each other & textiles are understood
- Properties & functions of Chemical s & auxiliaries used are identified
- Chemical & auxiliaries used in pretreatment are selected
- Chemical recipe formulation & setting of process parameters are prepared.

LO3. Set up and load pre-treatment machines and equipment

- Pretreatment processes required for textile product are confirmed based on the nature of the product and end user requirement.
- Textile product is checked for quality and conformity to specifications
- Non-conforming materials are reported
- Textile product is loaded into pretreatment machine according to the work procedure.

LO4. Operate and monitor pre-treatment equipment

- Pretreatment process & machines operation are undertaken according to workplace and work health and safety (WHS) requirements.
- Process is monitored to ensure product specifications and quality standards are achieved.
- Product is checked during and on completion of pretreatment process.
- Product faults are identified based on the specification.
- Minor product process and machine faults are identified and corrected where necessary to meet specified requirements and are reported.
- Major machine or product faults are reported.

LO5. Remove product and dispatch

- Product is checked against quality standards.
- Product is unloaded or removed from pretreatment area according to specifications.
- Product is dispatched to the next processes.
- Cleaning of area is completed to ensure work environment is maintained in a safe and

productive manner.

- Production records and other documentation are accurately completed.

Annex: Resource Requirements

IND TPT2 M03 0222: Performing Pretreatment Operations.						
Item No.	**Category/Item**	**Description/ Specifications**			**Quantity**	**Recommended Ratio (Item: Trainee)**
A. Learning Materials						
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet			1 pcs	1:25
2.	Reference Books					
2.1	Processing of cotton knitted fabrics	M. Chakraborty, Amit Dayal and M.L. Gulrajani, NITRA, 1998			1 pcs	1:25
2.2	Preparatory processes in textiles	A.K. Agrawal, Chemical, NCUTE, 2000.			1 pcs	1:25
2.3	Chemical processing of hand loom fabrics	RB Chavan, 1999.			1 pcs	1:25
B.	**Learning Facilities & Infrastructure**					
1.	Lecture rooms	7m*8m			1	1:25
2.	Library	30m*30m			1	1:25
B. Consumable Materials						
1.	Yarn	Cotton, Wool, polyester, Nylon, Acrylic etc			1Kg	1:25
2	Fabrics	Knitted, Woven and Non-woven etc.			10 m	2:25
3	Dyes, chemicals and Auxiliaries					
3.1	H_2O_2	Criteria	35% Ap	50% Ap	25 liter	1:5
		WW% H2O2 concentration	35.1-35.8	50.1-50.8		
		%Stability 3HRS,96^{o}C(	99.6	99.6		

		min)				
		PH(max)	2.4	1.6		
		Sp Gravity@25^{o}c $\pm$ 1^{O} (min)	1.13	1.19		
		Appearance	Clear	Clear		
3.2	NaOH	Form	Deliquescent		25 kg	1:5
		Boiling Point (^{O}C)	1390			
		Melting Point (^{O}C)	318			
		Solubility(water)	Soluble with evolution of heat			
		Specific gravity	2.13(water=1 at 4^{O}C)			
		Bulk Density (g/ml)	1.175			
3.3	Wetting agent	Grade Standard	Technical Standard		25 liter	1:5
		packaging	100ml/250ml/500 ml/1lit/&200lit			
		Form	Liquid			
		Purity in %	100%			
		Dosing	20-40ml in 15 liter water			
C. Tools, equipment and machineries						
1.	Digital Weighing balance	Display type :(LCD) Capacity: 220 gm Pan size: 80mm, power supply:			1 pcs	1:25

		12V Division: 0.0001g/0.1mg Wind glass				
2.	Beaker	Capacity 50 ml 100 ml 250 ml 500 ml	Diameter 4 cm 5cm 6cm 8cm	Height 6cm 7cm 10cm 12cm	1 pcs	1:25
3.	Pipet	Material: polystyrene Length: 348mm Capacity: 5ml			5 pcs	1:5
4.	Titrator	Water content: 0.1- 500mg H_2O Concentration:10mg/l – 100%H_2O Volume: 10 ml burette, discharge +-0.015mL, Repeatability +-0.005mL. Endpoint Detection: by polarized potential level detected with a twin platinum electrode.			1 pcs	1:25
5.	Spoon	Laboratory Spoon Spatula 150mm, stainless steel			5 pcs	1:5
6.	Thermometer	For kinematic viscosity Temperature range: 28.6 - 31.4℃ Length: 300 - 310mm Scale: 0.05℃ Immersion: Total immersion Material: Glass, mercury			5 pcs	1:5
7.	PH meter	Characteristics: value pH range: 0 to 14 pH pH Resolution: 0.01 pH pH Accuracy: 0.02pH T^O Range: -5.0 – 60.0 ^OC Response time: <=1minute			5 pcs	1:5

8.	Sample pretreatment & dyeing machines	Cooling : Air force Cooling Heating: Through Infra red Radiation M/C type: Automatic Automation: Micr oprocessor controller DC4F/R (DC10 F/R) Available Beaker capacity: 75ml, 100ml, 150ml, 200ml, 250ml, 500ml,100ml, 6000ml,10000ml	1 pcs	1:25
9.	Yarn pretreatment & dyeing machine	Material: Stainless steel Capacity: 30kg – 1000kg Usage: yarn dyeing M/C type: Automatic Shape: Round	1 pcs	1:25
10	Washing & squeezing machine	Capacity: 200kg – 500kg High temp up to $140^{O}C$ Working presser: 4kg/cm2 A Direct Steam heat M/C type: Automatic & semi automatic	1 pcs	1:25
11.	Drying machine	Dryer type: electric dryer Frequency: 50/60 Hz Phase: single phase Voltage: 220 – 440V Automation Grade: Automatic	1 pcs	1:25

LEARNING MODULE - 04
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE: **Performing dyeing operations**
MODULE CODE: **IND TPT2 M04 0222**
NOMINAL DURATION: **80 Hours**
MODULE DESCRIPTION: This module covers the skills, attitudes and knowledge to load and operate dyeing equipment.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Determine job requirements

LO2. Understand Dyeing processes

LO3. Set up and load machine

LO4. Operate and monitor dyeing machine

LO5. Complete dyeing operations

LO6. Check dye outcomes

MODULE CONTENTS:

LO1. Determine job requirements

1.1. Standard operating procedures (sops)

1.2. Complying with work health and safety (WHS)

- 1.2.1 Hazard identification and control
- 1.2.2 Risk assessment
- 1.2.3 Implementation of risk reduction measures

1.3. Using personal protective equipment (PPE)

1.4. Identifying job requirements

LO2. Understand dyeing processes

2.1. Understanding dyeing processes and its significance

2.2. Understanding dyeing technologies and its significance

2.3. Understanding dyes interaction

2.4. Understanding chemicals interaction

2.5. Understanding auxiliaries interaction

2.6. Understanding dyes, chemicals and auxiliaries interaction

2.7. Identifying dyes, chemicals & auxiliaries properties & functions

2.8.Selecting dyes, chemicals & auxiliaries

2.9.Preparing dyes & chemical recipe formulation and process parameters setting

LO3. Set up and load machine

3.1.Dye mixing

3.2.Checking dye worksheet

3.3.Measuring and loading textile materials , dyes, chemicals and auxiliaries

3.4.Reporting non-conforming materials

LO4. Operate and monitor dyeing machine

4.1.Operating dyeing machine

4.2.Monitoring dyeing operations

4.3.Identifying and correcting minor faults and reporting major machine faults

4.4.Product requirements

LO5. Complete dyeing operations

5.1 Unloading and dispatching product

5.2 Completing Cleaning area

5.3 Completing production records and other documentation

LO6. Check dye outcomes

6.1 Checking yarn or fabric quality

6.2 Assessing yarn or fabric faults

6.2 Rectifying or reporting yarn or fabric dyeing faults

Learning Methods:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1.Determine job requirements

- Follow standard operating procedures (SOPs)
- Comply with work health and safety (WHS) Use appropriate personal protective equipment (PPE) in accordance with SOPs
- Identify job requirements from specifications, drawings, job sheets or work instructions

LO2. Understand Dyeing processes

- Understand dyeing processes, technologies and its significance.
- Interaction of Dyes, Chemical s & auxiliaries with each other & textiles are understood
- Properties & functions of dyes, Chemicals & auxiliaries used are identified
- Dyes, Chemicals & auxiliaries used in dyeing are selected by getting support from his supervisor.
- Dyes & Chemical recipe formulation and setting of process parameters are prepared by getting support from his supervisor

LO3. Set up and load machine

- Dye is mixed according to dye worksheet using correct measuring devices and personal protective equipment.
- Dye worksheet is checked and if required entered into the dyeing machine.
- Dyes, Chemicals and auxiliaries are precisely measured & loaded into the dosing tank or machine according to work health and safety (WHS) requirements.
- Fibres, Yarns or fabrics is weighed and loaded for dyeing according to specifications.
- Non-conforming materials are reported.
- Area around dye tank or machine is kept clean during setting and loading

LO4. Operate and monitor dyeing machine

- Dyeing machine is started, operated and stopped according to manufacturer requirements.
- Dyeing operations are monitored to ensure conformance with dye worksheet.
- Tank or machine is cleaned when required.
- Minor faults are identified and corrected where necessary to meet specified product requirements and are reported.
- Major machine faults or incorrect dyeing are reported.

LO5. Complete dyeing operations

- Fibers, Yarn or fabric is unloaded.
- Product is dispatched to next process.
- Cleaning of area is completed to ensure work environment is maintained in a safe and productive manner.
- Production records and other documentation are accurately completed.

LO6. Check dye outcomes

- Yarn or fabric is checked against quality standards for dye coloring.
- Yarn or fabric is assessed for faults and non-conformances.
- Yarn or fabric dyeing faults are rectified or reported.

Annex: Resource Requirements

IND TPT2 M04 0222: Performing dyeing operations				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A. Learning Materials				
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet	1pcs	1:5
2.	Reference Books			
2.1	Textile Manufacturing Processes	Faheem Uddin, (August 28th, 2019), reviewed June 11th, 2019P	5 pcs	1:5
2.2	Textile manufacturing process	http://dx.doi.org/10.5772/intechopen.87968	5 pcs	1:5
2.3	Text Book & Practical Manual	Shiksha Kendra	5 pcs	1:5
2.4	Jose Cegarra and Punte, Dyeing of textile materials,	Texille, 1993	5 pcs	1:5
2.5	SK Karmakar, Chemical technology in the pretreatment process of textile materials,	Elsevier, 1999.	5 pcs	1:5
2.6	RB Chavan, Chemical processing of hand loom fabrics	1999	5 pcs	1:5
B. Learning Facilities & Infrastructure				
1.	Lecture rooms	7m*8m	1	1:25
2.	Library	30m*30m	1	1:25
3	Work shop	30m*40m	1	1:25
C. Consumable Materials				
1.	Paper	A4	1 Dusta	1:25
2	Marker	Non-permanent white board marker	1pack	1:25
3	Yarn.	Cotton, Wool, polyester, Nylon, Acrylic etc	1Kg	1:25
4	Fabrics	Knitted, Woven and Non-woven etc.	10 m	2:25

5	Salt	Hardness: 150mg-400mg/ l Packing wt: 50Kg Color: White Grade: Industrial Type: Dyeing	1Kg	1:25
5.	Direct dye	Form: powder Solubility: soluble in water Solid content: 90 – 95% Usage: textile industry	1Kg	1:25
6.	Reactive dye	Form: powder PH 1% solution: 7.85 Solubility: 90^{o} c- 50g/l Solid content: 90 – 95% Usage: wool, nylon, cotton	1Kg	1:25
7	Sulphur dye	Form: powder PH 1% solution: 10-11 To- 30 - 90o moisture: 6% max Solid content: 90 – 95% Purity: 95 – 98% Usage: textile dye stuffs	1Kg	1:25
8	Soda ash	Form: powder PH 1% solution: > 12.5 + 1 Water solubility: easily dissolve in water Solubility: > 87% Stability: Anion Usage: textile dye stuffs	1Kg	1:25
D. Tools and Equipments				
1.	Digital Weighing balance	Capacity: 220 gm Pan size: 80mm, power supply: 12V Division:0.0001g/0.1mg Wind glass	5 pcs	1:5
2	Beaker	Capacity / Diameter / Height	5 pcs	1:5

		50 ml	4cm	6cm		
		100 ml	5cm	7cm		
		250 ml	6cm	10cm		
		500 ml	8cm	12cm		
3	Pipet	Material: polystyrene Length: 348mm Capacity: 5ml			5 pcs	5:25
4	Titrator	Water content: 0.1- 500mg H2O Concentration:10mg/l – 100%H2O Volume: 10 ml burette, discharge +-0.015mL, Repeatability +-0.005mL. Endpoint Detection: by polarized potential level detected with a twin platinum electrode.			1 pcs	1:25
5	Spoon	Laboratory Spoon Spatula 150mm, stainless steel			10 pcs	10:25
6	Thermometer	For kinematic viscosity Temperature range: 28.6 - 31.4℃ Length: 300 - 310mm Scale: 0.05℃ Immersion: Total immersion Material: Glass, mercury			5 pcs	1:5
7	PH meter	Characteristics: value pH range: 0 to 14 pH pH Resolution: 0.01 pH pH Accuracy: 0.02pH TO Range: -5.0 – 60.0 OC Response time: <=1minute			5 pcs	1:5
4	Lap top Computer	Hp 8 GB ram			1 pcs	1:25
5	Computer	▪ RAM Size: 12 GB ▪ Processor Speed: 2.93 GHz ▪ Features: Built-in Speakers			1 pcs	1:25

		▪ Processor: Intel Xeon 8-Core ▪ Graphics Processing Type: Dedicated Graphics ▪ Operating System: Windows 10 Pro ▪ Connectivity: USB 2.0, Display Port ▪ Maximum RAM Capacity: 48 GB ▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz		
6	LCD Projector	▪ Compatible Operating System: Android and Windows operating systems ▪ Native Resolution: 1920x1080 ▪ Resolution: 1080p ▪ Display Technology: LED ▪ Contrast Ratio: 100000:1 ▪ Aspect Ratio: 16:9 ▪ Features: Built-in Speakers ▪ Image Brightness: 600 ANSI Lumens ▪ Connections: USB ▪ Dimension: 170 x 170 x 49 mm	1 pcs	1:25

LEARNING MODULE - 05
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE: **Performing Printing Operations**
MODULE CODE: **IND TPT2 05 0222**
NOMINAL DURATION: **80 Hours**
MODULE DESCRIPTION: This module covers the knowledge, attitudes and skills to operate different printing machines and equipment to produce printed textiles and garments.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Determine job requirements

LO2. Understand Printing processes

LO3. Set up and load machine

LO4. Operate and monitor printing machine

LO5. Complete printing operations

MODULE CONTENTS:

LO1. Determine job requirements

1.1. Standard operating procedures (SOPs)

1.2. Complying with work health and safety (WHS)

1.2.1 Hazard identification and control

1.2.2 Risk assessment

1.2.3 Implementation of risk reduction measures

1.3. Using personal protective equipment (PPE)

1.4. Identifying job specifications

LO2.Understand Printing processes

2.1. Understanding printing processes, technologies and its significance

2.2. Understanding chemicals, auxiliaries, pigments or dyes chemicals Interaction

2.3. Understanding chemicals, auxiliaries and pigments or dyes interaction with textiles

2.4. Identifying pigments, dyes, chemical & auxiliaries properties and functions

2.5. Selecting chemical, auxiliaries, Pigments or dyes

2.6. Preparing chemical, pigments or dyes recipe formulation and process parameters setting

LO3. Set up and load machine

3.1 Receiving and checking printing paste

3.2 Receiving and checking printing screen

3.3 Loading the print paste and screen on the printing machine

3.4 Making the machine ready for printing

3.5 Cleaning work area

LO4. Operate and monitor printing machine

4.1. Operating printing machine

4.2. Monitoring printing operations

4.3. Identifying and correcting minor faults and reporting major machine or printing faults

LO5. Complete printing operations

5.1 Unloading and dispatching printed fabric

5.2 Completing production records and other documentation.

Learning Methods:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Follow standard operating procedures (SOPs)
- Comply with work health and safety (WHS) requirements at all times
- Use appropriate personal protective equipment (PPE) in accordance with SOPs
- Identify job requirements from specifications, drawings, job sheets or work instructions.

LO2. Understand Printing processes

- Understand printing processes, technologies and its significance.
- Interaction of Chemicals, auxiliaries, pigments or dyes with each other & textiles are understood.
- Properties & functions of pigments, dyes, Chemical & auxiliaries used are identified
- Chemical, auxiliaries, Pigments or dyes used in printing are selected
- Chemical, Pigments or dyes recipe formulation and setting of process parameters are prepared.

LO3. Set up and load machine

- Receive and check the prepared printing paste according to printing worksheet.
- Check and receive the prepared screen according to design and required number.
- Load the screen on the printing machine by maintaining the correct register.
- Load the leading cloth attached to the fabric to be printed on the printing machine.
- Connect the printing paste with the printing machine by referring the sample and the screen design.
- Clean work area are Cleaned
- Make the machine ready for printing.

LO4. Operate and monitor printing machine

- Printing machine is started, operated and stopped according to manufacturer requirements.
- Printing operations are monitored to ensure conformance with printing worksheet.
- Minor faults are identified and corrected where necessary to meet specified requirements and are reported.
- Major machine faults or incorrect printing are reported.

LO5. Complete printing operations

- Printed fabric or garment is unloaded.
- Product is dispatched to next process.
- Cleaning of area is completed to ensure work environment is maintained in a safe and productive manner.
- Production records and other documentation are accurately completed

Annex: Resource Requirements

IND TPT2 05 0222: Performing Printing Operations				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet	1pcs	1:25
2.	Reference Books			
2.1	Textile Printing Technology Revised Second Edition	Leslie W C Miles	5 pcs	1:5
2.2	Introduction to. Textile Printing	W.Clarke, B.Sc.Tech., A.M.CT.	5 pcs	1:5
B.	**Learning Facilities & Infrastructure**			
1.	Lecture rooms	7m*8m	1	1:25
2.	Library	30m*30m	1	1:25
C.	**Consumable Materials**			
1.	Paper	A4	1 Dusta	1:25
2	Fabrics	Knitted, Woven and Non-woven etc.	10 m	2:25
2	Marker	Non-permanent white board marker	1pack	1:25
3	Printing paste ingredients	• Dyestuffs and Pigments.	1kg	1:25
		• Thickener.	1kg	1:25
		• Acid or alkali or acid liberating agents.	1kg	1:25
		• Carrier or swelling agents.	1kg	1:25
		• Solvents or solution acids or dispersing agents or humectants.	1kg	1:25
		• Antifoaming agents or de-foaming agents.	1kg	1:25
		• Wetting agents	1kg	1:25
		• Catalyst or oxygen carrier.		
D.	**Tools and Equipments**			
1.	Lap top Computer	Hp 8 ram	1 pcs	1:25
2	Printing machine	• Contour Laser Cutter for Digital Printed Fabrics with Vision CCD Camera	1 pcs	1:25
		• CALCA 6 Color 6 Station Screen Printing Machine Press T-shirt	1 pcs	1:25

		Printer Carousel		
		•4-color 1-station Silk screen printing machine T-shirt Press DIY Kit equipment	1 pcs	1:25
3	Lap top Computer	Hp 8 GB ram	1 pcs	1:25
4	Computer	▪ RAM Size: 12 GB ▪ Processor Speed: 2.93 GHz ▪ Features: Built-in Speakers ▪ Processor: Intel Xeon 8-Core ▪ Graphics Processing Type: Dedicated Graphics ▪ Operating System: Windows 10 Pro ▪ Connectivity: USB 2.0, Display Port ▪ Maximum RAM Capacity: 48 GB ▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz	1 pcs	1:25
5	LCD Projector	▪ Compatible Operating System: Android and Windows operating systems ▪ Native Resolution: 1920x1080 ▪ Resolution: 1080p ▪ Display Technology: LED ▪ Contrast Ratio: 100000:1 ▪ Aspect Ratio: 16:9 ▪ Features: Built-in Speakers ▪ Image Brightness: 600 ANSI Lumens ▪ Connections: USB ▪ Dimension: 170 x 170 x 49 mm	1 pcs	1:25

LEARNING MODULE- 06
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE: **Performing final finishing operations**
MODULE CODE: **IND TPT2 M06 0222**
NOMINAL DURATION: **91Hours**
MODULE DESCRIPTION: This module covers the skills and knowledge to conduct final finishing operations using appropriate machines to deliver finished textile products.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Determine job requirements **LO2.** Understand Finishing processes **LO3**. Set up and load finishing machine or equipment **LO4.** Operate and monitor finishing machines or equipment **LO5.** Remove product and dispatch **LO6.** Finishing machines **LO7.** Complete records
MODULE CONTENTS: **LO1. Determine job requirements** 3.1. Standard operating procedures (SOPs) 3.2. Complying with work health and safety (WHS) requirements 3.2.1 Hazard identification and control, 3.2.2 Risk assessment 3.2.3 Implementation of risk reduction measures 3.3 Using personal protective equipment (PPE) 3.4 Identifying job requirements **LO2. Understand Finishing processes** 3.5 Understanding finishing processes, technologies and its significance 3.6 Understanding chemicals & auxiliaries interaction with each other and textiles 3.7 Identifying finishing chemicals and auxiliaries properties & functions 3.8 Identifying mechanical finishes properties & functions 3.9 Selecting and using chemicals, auxiliaries & mechanical finishing types

3.10 Preparing chemical recipe formulation and process parameters settings

LO3. Finishing machines

3.1 Identifying finishing machine types, properties and functions

LO4. Set up and load finishing machine or equipment

4.1 Confirming textile product finishing processes

4.2 Confirming textile products

4.3 Loading textile product and finishing chemicals

4.4 Checking finishing quality

4.5 Reporting non-conforming materials

LO5. Operate and monitor finishing machines or equipment

5.1 Undertaking finishing process operations

5.2 Identifying & monitoring processes and products faults

5.3 Identifying and correcting minor product process and machine faults

5.4 Reporting major machine or product faults

LO6. Remove product and dispatch

6.1 Checking product quality

6.2 Unloading and dispatching product

LO7. Complete records

7.1 Completing production records and other documentation

Learning Methods:
▪ Lecture and Discussion ▪ Démonstration ▪ Simulation ▪ Role playing
Assessment Methods:
▪ Written test ▪ Oral questioning ▪ Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Follow standard operating procedures (SOPs)
- Comply with work health and safety (WHS) requirements at all times
- Use appropriate personal protective equipment (PPE) in accordance with SOPs
- Identify job requirements from specifications, drawings, job sheets or work instructions

LO2. Understand Finishing processes

- Understand finishing processes, technologies and its significance.
- Interaction of Chemical s & auxiliaries with each other and textiles are understood.
- Properties & functions of Chemicals, auxiliaries and types of mechanical finishes used are identified
- Chemicals, auxiliaries & other mechanical finishing types that are used and selected.
- Chemical recipe formulation and settings of process parameters are prepared.

LO3. Finishing machines

- Sanforizer finishing machine is understood and used
- Stenter finishing machine is understood and used
- Calendaring finishing machine is understood and used
- Compactor finishing machine is understood and used
- Loop stamer finishing machine is understood and used
- Raising machines finishing machine is understood and used
- Shearing machine finishing machine is understood and used

LO4. Set up and load finishing machine or equipment

- Finishing processes required for textile product are confirmed.
- Textile product is checked for quality and conformity to specifications.
- Non-conforming materials are reported.
- Textile product is loaded into finishing machine or prepared for final finishing.

LO5. Operate and monitor finishing machines or equipment

- Finishing process operations are undertaken according to workplace and work health and safety (WHS) requirements.
- Processes, products and faults are monitored & identified to ensure product specifications and quality standards are achieved.
- Minor product process and machine faults are identified and corrected where necessary to meet specified requirements and are reported.

- Major machine or product faults are reported.

LO5. Remove product and dispatch

- Product is checked against quality standards.
- Product is unloaded or removed from finishing area according to specifications.
- Product is dispatched.
- Cleaning of area is completed to ensure work environment is maintained in a safe and productive manner

LO7. Complete records

- Production records and other documentation are accurately completed.

Annex: Resource Requirements

IND TPT2 M06 0222: Performing final finishing operations				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	TTLM	Containing: Learning guide, teachers guide and Assessment Packet	1pc	1:25
2	References	Chemistry & Technology of Fabric Preparation & Finishing by Dr. Charles Tomasino	5pcs	1:5
B.	**Learning Facilities & Infrastructure**			
1.	Lecture Room	Area- 7m*8m	1pc	1:25
2.	Library	Area- 30mX30m	1pc	1:25
C.	**Consumable Materials**			
1.	Paper	A4	1dusta	1:25
2.	Marker	Non-permanent white board marker	2pcs	2:25
3.	Water proof chemicals	▪ Classification: Chemical Auxiliary Agent ▪ Type: Adsorbent ▪ Usage: Coating Auxiliary Agents, Leather Auxiliary Agents, Textile Auxiliary Agents	5L	1:5
4.	Fire retardant chemicals (Ammonium Polyphosphate)	▪ Phosphorus: 31%-32% ▪ Nitrogen: 14%-15% ▪ Water: <0.5% ▪ PH: 5.5 – 7.5 ▪ State: solid powder form	5kg	1:5
5.	Anti-microbial chemicals (Chlorhexidine gluconate)	▪ Purity: ≥20.0% ▪ Appearance: colorless or light yellow transparent and slightly sticky liquid	5L	1:5

		▪ Odor: odorless or almost odorless ▪ Relative density: 1.060 ～ 1.070g / ml (25 ℃) ▪ pH Value（5%）: 5.5-7.0 ▪ soluble: miscible with water and soluble in ethanol or acetone		
6.	Fabric	Any knitted or woven fabrics	75m	5:1
D.	**Tools and Equipments**			
1.	Digital weighing balance	320g 0.1mg precision electronic analytical balance	1pc	1:25
2.	Spoon	Laboratory Spoon Spatula 150mm, stainless steel	5pcs	1:5
3.	Thermometer	▪ For kinematic viscosity ▪ Temperature range: 28.6 - 31.4℃ ▪ Length: 300 - 310mm ▪ Scale: 0.05℃ ▪ Immersion: Total immersion ▪ Material: Glass, mercury	5pcs	1:5
4.	Beakers	▪ Material: borosilicate glass-1 ▪ Heat resistance: 250 ° C ▪ Capacity: 10 L ▪ Body outer diameter: φ 230 mm ▪ overall height: 360 mm ▪ One scale: about 1000 mL	5 pcs	1:5
5.	Computer	▪ RAM Size: 12 GB ▪ Processor Speed: 2.93 GHz ▪ Features: Built-in Speakers ▪ Processor: Intel Xeon 8-Core ▪ Graphics Processing Type: Dedicated Graphics ▪ Operating System: Windows 10 Pro ▪ Connectivity: USB 2.0, Display Port ▪ Maximum RAM Capacity: 48 GB	1 pcs	1:25

		▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz		
6	LCD Projector	▪ Android and Windows operating systems ▪ Native Resolution: 1920x1080 ▪ Resolution: 1080p ▪ Display Technology: LED ▪ Contrast Ratio: 100000:1 ▪ Aspect Ratio: 16:9 ▪ Features: Built-in Speakers ▪ Image Brightness: 600 ANSI Lumens ▪ Connections: USB ▪ Dimension: 170 x 170 x 49 mm	1 pcs	1:25

LEARNING MODULE - 07
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE : **Performing final inspection and packaging of finished Textiles**
MODULE CODE: **IND TPT2 M07 0222**
NOMINAL DURATION: **60Hours**
MODULE DESCRIPTION: This module covers the knowledge, attitudes and skills to conduct inspection, folding, rolling and labeling of textile or garment products for warehousing or distribution.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Determine job requirements **LO2.** Prepare work pieces and workstation **LO3**. Operating, inspection and packaging tasks **LO4**. Dispatch completed work
MODULE CONTENTS: **LO1. Determine job requirements** 1.1 . Standard operating procedures (SOPs) 1.2 . Complying with work health and safety (WHS) 1.2.1 Hazard identification and control 1.2.2 Risk assessment 1.2.3 Implementation of risk reduction measures 1.3 Identifying job requirements **LO2. Prepare work pieces and workstation** 2.1 Laying out work pieces or materials in sequence 2.2 Setting up or preparing work area 2.3 Setting up machine or process 2.4 Performing routine minor maintenance & simple adjustments 2.5 Recording and reporting problems **LO3**. **Operating, inspection and packaging tasks** 3.1 Operating machine or conducting process 3.2 Inspecting fabric and recording faults

3.3 Grading inspected fabrics

3.4 Packing inspected fabric

3.5 Assessing work quality

LO4. Dispatch completed work

4.1. Checking packed textile / garment products

4.2. Recording and reporting faults

4.3. Directing completed products

4.4. Completing work documentation

Learning Methods:

- Lecture and Discussion
- Démonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Follow standard operating procedures (SOPs)
- Comply with work health and safety (WHS) requirements at all times
- Use appropriate personal protective equipment (PPE) in accordance with SOPs
- Identify job requirements from specifications, drawings, job sheets or work instructions

LO2. Prepare work pieces and workstation

- Work pieces or materials are laid out in sequence
- Work area, bench or seating are set up or prepared according to work health and safety (WHS) requirements
- Machine or process is set up
- Routine minor maintenance & simple adjustments are performed as required according to manufacturer specifications
- Any problems are reported and recorded

LO3. Operating, inspection and packaging tasks

- Machine is operated or process conducted
- Fabric is inspected and faults recorded
- Inspected fabrics are graded according to the standard given
- Inspected fabric is packed
- Work is assessed for compliance with quality

LO4. Dispatch completed work

- Textile / garment packed products are checked against specifications and labels
- Any faults identified are reported and recorded
- Completed products are directed for dispatch
- Work documentation is completed as required

Annex: Resource Requirements

IND TPT2 M07 0222: Performing final inspection and packaging of finished Textiles				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	TTLM	Containing: Learning guide, teachers guide and Assessment Packet	1 pcs	1:25
2	References			
B.	**Learning Facilities & Infrastructure**			
1.	Lecture Room	Area- 7m*8m	1	1:25
2.	Library	Area- 30mX30m	1	1:25
C.	**Consumable Materials**			
1.	Paper	A4	1dusta	1:25
2	Marker	Non-permanent white board marker	2pack	2:25
4	Textile material	Any fiber, knitted or woven fabrics	25kg	1:1
D.	**Tools and Equipments**			
1.	Pick glass	▪ Size: 1x1inch ▪ Magnification: 6x	5 pcs	1:5
2.	Fabric Inspection Machine	▪ Video outgoing-inspection: Provided ▪ Core Components: PLC, Bearing, Pressure vessel ▪ Automatic Grade: Automatic ▪ Power: 1.5KW ▪ Machinery Test Report: Provided ▪ Dimension(L*W*H): 2480*1200*1300mm	1 pcs	1:25
3.	Computer	▪ RAM Size: 12 GB ▪ Processor Speed: 2.93 GHz ▪ Features: Built-in Speakers ▪ Processor: Intel Xeon 8-Core ▪ Graphics Processing Type: Dedicated Graphics ▪ Operating System: Windows 10 Pro	1 pcs	1:25

		▪ Connectivity: USB 2.0, Display Port ▪ Maximum RAM Capacity: 48 GB ▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz		
4.	LCD Projector	▪ Android and Windows operating systems ▪ Native Resolution: 1920x1080 ▪ Resolution: 1080p ▪ Display Technology: LED ▪ Contrast Ratio: 100000:1 ▪ Aspect Ratio: 16:9 ▪ Features: Built-in Speakers ▪ Image Brightness: 600 ANSI Lumens ▪ Connections: USB ▪ Dimension: 170 x 170 x 49 mm	1 pcs	1:25

LEARNING MODULE- 08
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE: **Using Specialized Machinery to Assist Textile processing Production**
MODULE CODE: **IND TPT2 M08 0222**
NOMINAL DURATION: **70 Hours**
MODULE DESCRIPTION: This module covers the skills, knowledge, and attitude to use specialized machinery or equipment to assist in the production of textile products.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Determine job requirements

LO2. Prepare for specialized machine operation

LO3. Operate specialized machine

LO4. Dispatch completed work

Module contents:

LO1. Determine job requirements

1.1. Standard operating procedures (SOPs)

1.2. Complying with work health and safety (WHS) requirements

1.2.1 Hazard identification and control

1.2.2 Risk assessment

1.2.3 Implementation of risk reduction measures

1.3 Using personal protective equipment (PPE)

1.4 Identifying job requirements

LO2. Prepare for specialized machine operation

2.1. Laying out work pieces or materials in sequence

2.2. Setting up or preparing work area, bench or seating

2.3. Preparing and adjusting specialized machine

2.4. Identifying & documenting activities

LO3. Operate specialized machine

3.1. Operating specialized machine

3.2. Checking and adjusting specialized machine

LO4. Dispatch completed work

4.1. Checking production outputs

4.2. Recording and reporting machine or product faults

4.3. Directing outputs

4.4. Completing work documentation

Learning Methods:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Standard operating procedures (SOPs) is followed
- Work health and safety (WHS) requirements at all times is Complied
- Appropriate personal protective equipment (PPE) is used
- Job requirements from specifications, drawings, job sheets or work instructions is identified

LO2. Prepare for specialized machine operation

- Work pieces or materials are laid out in sequence.
- Work area, bench or seating are set up or prepared according to work health and safety (WHS) requirements.
- Specialized machine is prepared and adjusted according to the specifications for the work.
- Activities to be performed are identified & documented

LO3. Operate specialized machine

- Specialized machine is operated.
- Work health and safety (WHS) requirements are followed.
- Work is assessed for compliance with quality standards and production specifications.
- Specialized machine is checked during production and adjusted to ensure optimum performance.

LO4. Dispatch completed work

- Production outputs are checked against quality standards.
- Any machine or product faults identified are reported and recorded.
- Outputs are directed to the next operation.
- Work documentation is completed as required

Annex: Resource Requirements

IND TPT2 M08 0222 : Using Specialized Machinery to Assist Textile processing Production				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A. Learning Materials				
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet	1 pcs	1:25
2.	Journals and websites			
2.1	Steaming in textile processing – a manufacturers view	Claus Tischbein Babcock Textilmaschinen GmbH, Postfach 3148, 0-21 05 Seeuetal3, West Germany	1 pcs	1:25
2.2	Laser Cutting-Engraving Operating and Maintenance Manual	Jian Liu	1 pcs	
2.3	Flow Chart of Batch Section in Textile; Functions and Purposes of Batching in Dyeing	January 27, 2013 by Mazharul Islam Kiron	1 pcs	
2.4	Dosing Technology	Sera enterprise	1 pcs	1:25
B. Learning Facilities & Infrastructure				
1.	Lecture rooms	8m*7m	1	1:25
2.	Library	5m*4m	1	1:25
C.	**Consumable Materials**			
1.	Gloves	Medical type	125 pcs	1:5
2.	Face mask	Medical type	125 pcs	1:5
D.	**Tools and Equipments**			
1.	Workshop (laboratory)	Textile processing	1	1:25
2	Demonstration site	Any textile processing unit/pilot plant	1	1:25

LEARNING MODULE- 09
TVET-PROGRAMME TITLE: **Textile Processing Technology Level II**
MODULE TITLE: **Performing online process quality control**
MODULE CODE: **IND TPT2 M09 0222**
NOMINAL DURATION: **80 Hours**
MODULE DESCRIPTION: This module covers the skills, knowledge and attitude to test and check textiles or garments qualities which are online/inprocess.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Prepare for test

LO2. Determine job requirements

LO3. Perform on line process test

LO4. Record and report result

MODULE CONTENTS:

LO1. Determine job requirements

1.1 Standard operating procedures (SOPs)

1.2 Complying with work health and safety (WHS)

1.2.1 Hazard identification and control

1.2.2 Risk assessment

1.2.3 Implementation of risk reduction measures

1.3 Using personal protective equipment (PPE)

1.4 Identifying job requirements

LO2. Prepare for test

2.1 Selecting materials or samples

2.2 Selecting, preparing equipment and confirming calibration

LO3. Perform on line process test

3.1 Identifying specific standards

3.2 Testing on-process samples

LO4. Record and report result

4.1 Converting collected data for interpretation

4.2 Reporting outcomes and advising appropriate personnel

4.3 Recording result

Learning Methods:
▪ Lecture and Discussion ▪ Demonstration ▪ Simulation ▪ Role playing
Assessment Methods:
▪ Written test ▪ Oral questioning ▪ Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine job requirements

- Follow standard operating procedures (SOPs)
- Comply with work health and safety (WHS) requirements at all times
- Use appropriate personal protective equipment (PPE) in accordance with SOPs
- Identify job requirements from specifications, drawings, job sheets or work instructions

LO2. Prepare for test

- Appropriate materials or samples are selected
- Equipment is selected, prepared and calibration confirmed

LO3. Perform on line process test

- Specific standards are identified according to customer demand.
- On-process samples are tested against specified standards according to required quality standards

LO4. Record and report result

- Data collected is converted into a form suitable for interpretation where required
- Outcomes are reported and appropriate personnel advised
- Result is recorded

Annex: Resource Requirements

IND TPT1 M09 0222 : Performing online process quality control				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
		A. Learning Materials		
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet	1 pcs	1:25
1. Journals/Publication/Magazines				
2.1	Process control in dying of textiles	Process control in in txtile manufacturing (pp 300-338)	1 pcs	1:25
2.2	The future of dye house quality control with the introduction of right first dyeing technology	By Melih Gunay	1 pcs	1:25
2.3	Measurement and control of dyeing	W.J. Jasper, M. Günay, in Modelling, Simulation and Control of the Dyeing Process, 2014	1 pcs	
2.4	A sustainable approach to meeting the quality of product in textile dyeing industry; right first time (RFT)	American Journal of Chemistry and Materials Science 2018; 5(5): 78-84	1 pcs	1:25
2.5	Evaluation and Testing of Dyes Before Use in Textile Dyeing	J Park and J Shore	1 pcs	1:25
2.6	Methods for quality assessment in general practice	Rethans J-J, Westin S and Hays R. Methods for quality assessment in general practice. Family Practice 1996; 13: 468-476. international journal	1 pcs	1:25
2.7	Process control in dyeing of textiles	S.M. Shang, in Process Control in Textile Manufacturing, 2013	1 pcs	1:25
		B. Learning Facilities & Infrastructure		
1.	Lecture rooms with full facilities	8m*7m	1	1:25
2.	Library	7m*8m	1	1:25
C.	**Consumable Materials**			
1.	Eye goggle	Transparent plastic glass	25 pcs	1:1
2.	Gloves	Medical type	125 pcs	1:5
3.	Face mask	Medical type	125 pcs	1:5
D.	**Tools and Equipments**			
1.	Workshop (laboratory)	Textile processing	1	1:25
2	Demonstration site	Any textile processing unit/pilot plant	1	1:25

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