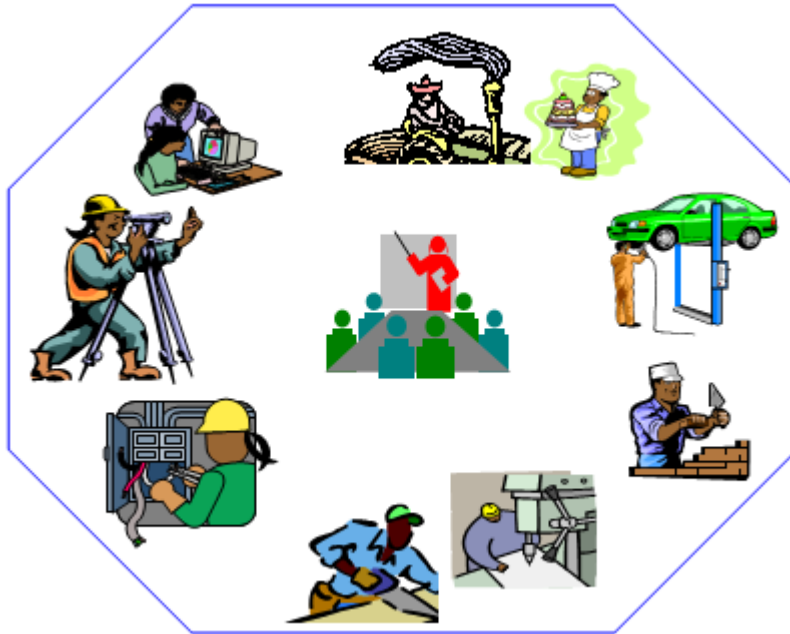# TEXTILE PROCESSING TECHNOLOGY

LEVEL – V

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 V**.**

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 V**

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 Processer 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 Plan and Implement Textile processing Production, Manage Textile processing Production, Prepare procedures and specifications for Textiles Operations, Produce screen printed textiles and perform screen printing troubleshooting, Analyze use of color in textiles**,** Identify Opportunities in the Textile Market, Manage Environment Impact of textile Process 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 TPT5 01 1221 Plan and Implement Textile processing Production

IND TPT5 02 1221 Manage Textile processing Production

IND TPT5 03 1221 Prepare procedures and specifications for Textiles Operations

IND TPT5 04 1221 Produce screen printed textiles and perform screen printing troubleshooting

IND TPT5 05 1221 Analyze use of color in textiles

IND TPT5 06 1221 Identify Opportunities in the Textile Market

IND TPT5 07 1221 Manage Environment Impact of textile Process

1.4. Duration of the TVET-Program

The Program will have duration of **576** *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.	Plan and Implement Textile processing Production	50	20	10	80	
2.	Manage Textile processing Production	14	20	20	54	
3.	Prepare procedures and specifications for Textiles Operations	20	30	20	70	
4.	Produce screen printed textiles and perform screen printing troubleshooting	40	40	40	120	
5.	Analyze use of color in textiles	40	40	20	100	
6.	Identify Opportunities in the Textile Market	36	28	28	92	
7.	Manage Environment Impact of textile Process	40	10	10	60	
	Total	240	188	148	**576**	

1.5.   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 V**.**

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.

1.6.   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 TPT5 01 1221	Plan and Implement Textile processing Production	**IND TPT5 M01 0222**	Planning and Implementing Textile processing Production	▪ Determine production requirements ▪ Prioritize and sequence production ▪ Organize team and resources ▪ Implement and monitor work flow ▪ Implement variations to production plan ▪ Maintain records	80
IND TPT5 02 1221	Manage Textile processing Production	**IND TPT5 M02 0222**	Managing Textile processing Production	▪ Coordinate resource use ▪ Manage the process ▪ Facilitate process problem resolution ▪ Monitor process improvements and variations	54
IND TPT5 03 1221	Prepare procedures and specifications for Textiles Operations	**IND TPT5 M03 0222**	Preparing procedures and specifications for processing Textiles	▪ Identify relevant requirements ▪ Prepare specifications ▪ Prepare standard operating procedures or manuals ▪ Review procedures and specifications against standards ▪ Maintain records	70
IND TPT5 04 1221	Produce screen printed textiles and perform screen printing	**IND TPT5 M04 0222**	Producing screen printed textiles and perform screen	▪ Interpret production requirements Complete documentation ▪ Apply screen printing procedure ▪ Produce Textile printed sample	120

	troubleshooting		printing troubleshooting		
IND TPT5 05 1221	Analyze use of color in textiles	**IND TPT5 M05 0222**	Analyzing use of color in textiles	▪ Analyze effects of color used in textiles ▪ Analyze suitable color combinations for use in textile design ▪ Consider use of color in textile design	100
IND TPT5 06 1221	Identify Opportunities in the Textile Market	**IND TPT5 M06 0222**	Identifying Opportunities in the Textile Market	▪ Conduct market research ▪ Analyze textile market opportunities ▪ Conduct tests on textile concepts ▪ Prepare a strategic plan	92
IND TPT5 07 1221	Manage Environment Impact of textile Process	**IND TPT5 M07 0222**	Managing Environment Impact of textile Process	▪ Develop resource conservation practices and procedures ▪ Develop pollution management practices and procedures ▪ Develop waste management practices and procedures	60

*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 **A Level** above who have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE 01

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

MODULE TITLE: **Planning and Implementing Textile Processing Production**

MODULE CODE: **IND TPT V M01 0222**

NOMINAL DURATION: **80 Hours**

MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes required to plan and implement production within a textile processing unit

LEARNING OUTCOMES

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

LO1. Determine production requirements

LO2. Prioritize and sequence production

LO3. Organize team and resources

LO4. Implement and monitor work flow

LO5. Implement variations to production plan

LO6. Maintain records

MODULE CONTENTS:

LO1. Determine production requirements

  1.1. Identifying projected quantity, quality requirements, standard times and production capacities

  1.2. Identifying production process and material handling options

  1.3. Establishing production order resource requirements

LO2. Prioritize and sequence production

  2.1. Prioritizing production demands, customer requests, requirements and efficiency standards

  2.2. Identifying process steps

  2.3. Selecting implementation solutions

  2.4. Preparing documentation

LO3. Organize team and resources

  3.1. Selecting and organizing work teams

  3.2. Identifying and organizing facility, equipment, material and resources

LO4. Implement and monitor work flow

  4.1. Monitoring work flow

4.2. Implementing monitoring methods

4.3. Applying troubleshooting guide

LO5. Implement variations to production plan

5.1. Coordinating systematic implementation of plan variations

5.2. Identifying and dealing inefficiencies and re-allocating work

5.3. Defining and communicating team or individual

LO6. Maintain records

6.1. Maintaining and updating records

6.2. Preparing reports

6.3. Accomplishing documentation

Learning Methods:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Determine production requirements

- Projected quantity and quality requirements, standard times and production capacities are identified
- Production process and material handling options are identified
- Resources required for the project or production order are established

LO2. Prioritize and sequence production

- Work is taking into account production demands, customer requests, requirements and efficiency standards of the workplace are prioritized
- Steps required for the process ensuring most efficient use of resources are identified
- Documentation in accordance with workplace practices is prepared
- Implement solutions are selected

LO3. Organize team and resources

- In accordance with workplace practices, Work team is selected and organized
- Facility, equipment and material and resources required for the production process are identified and organized in accordance with the production schedule and WHS practices

LO4. Implement and monitor work flow

- Work flow is monitored to ensure production schedule is maintained.
- Methods are implemented to ensure that work is directed to each work area or location as required, and potential congestion areas are identified.
- Troubleshooting is occurred on a regular basis in response to breakdowns, absenteeism and other factors

LO5. Implement variations to production plan

- Systematic implementation of variations to the production plan is coordinated to ensure production meets the schedule and specifications.
- Work is re-allocated in accordance with production priorities, where required.
- Inefficiencies are identified and dealt with in accordance with workplace production practices.
- Team or individual responsibilities are defined and communicated

LO6. Maintain records

- Records are maintained and updated
- Reports are prepared, where necessary, in accordance with workplace procedures
- Necessary documentation is accomplished in accordance with standard procedures

	IND TPT5 M01 0222 : Planning and Implementing 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	1:25
2.	Journals/Publication/ Magazines			
2.1	Production planning and control in textile industry: A case study	Nikos I. Karacapilidis, Costas P. Pappis; May 1996	1	1:25
2.2	Basic Procedure of Production Planning and Control in Textile Industry	By: R.S. Balakumar	1	1:25
	B. Learning Facilities & Infrastructure			
1.	Lecture Room	Area- 7m*8m	1	1:25
2.	Library	Area- 30mX30m	1	1:25
3	Workshop (laboratory)	Textile processing	1	1:25
4	Demonstration site	Any textile processing unit/pilot plant	1	1:25
	C. Consumable Materials			
1.	Paper	A4	1dusta	1:25
2	Marker	Non-permanent white board marker	2	2:25
D.	Tools and Equipments			
1.	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	1:25

2.	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	1:25

LEARNING MODULE - 02
TVET-PROGRAMME TITLE: **Textile Processing Technology Level V**
MODULE TITLE: **Managing Textile Processing production**
MODULE CODE: **IND TPT5 M02 0222**
NOMINAL DURATION: **54Hours**
MODULE DESCRIPTION: This module covers the skills, attitudes and knowledge required to manage the technical processes in the preparation of resource, monitoring production stages and measuring specified process parameters.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Coordinate resource use **LO2.** Manage the process **LO3.** Facilitate process problem resolution **LO4.** Monitor process improvements and variations

MODULE CONTENTS:

LO1. Coordinate resource use

    1.1 Interpreting technical process requirements

    1.2 Confirming schedules and technical resources

    1.3 Clarifying process and WHS requirements

LO2. Manage the process

    2.1 Allocating roles and responsibilities

    2.2 Monitoring technical process and providing guidance

    2.3 Monitoring process parameters

    2.4 Monitoring process safety

LO3. Facilitate process problem resolution

    3.1 Identifying process problem solving methods

    3.2 Using process improvement and technical systems knowledge

    3.3 Recommending and documenting problem resolving options

    3.4 Facilitating problem resolution implementation option

LO4. Monitor process improvements and variations

    4.1 Monitoring process improvements and variations

    4.2 Collecting and analyzing process improvements or variations data

Learning Methods:

- Lecture and Discussion
- Démonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Coordinate resource use

- Technical process requirements are interpreted in terms of resources and procedures
- Schedules and technical resources are confirmed with relevant personnel
- Process and WHS requirements are clarified, where necessary

LO2. Manage the process

- Roles and responsibilities are allocated as required
- Technical process is monitored and guidance provided where required
- Process parameters are monitored to ensure conformance to requirements
- Safety associated with the process including chemical handling is monitored

LO3. Facilitate process problem resolution

- Methods to solve process problems are identified through facilitation of meetings or discussions
- Knowledge of process improvement and technical systems are used to assist in the systematic identification and resolution of process problems
- Preferred option to resolve the problem is recommended and documented
- Implementation of the recommended problem resolution option is facilitated

LO4. Monitor process improvements and variations

- Improvements and variations to process are monitored to ensure outcome meets specifications, production schedule and workplace requirements
- Data is collated and analyzed to evaluate the effectiveness of process improvements or variations

Annex: Resource Requirements

<table>
<tr><td colspan="5">IND TPT5 M02 0222: Managing Textile Processing production</td></tr>
<tr><td>Item No.</td><td>Category/Item</td><td>Description/ Specifications</td><td>Quantity</td><td>Recommended Ratio (Item: Trainee)</td></tr>
<tr><td colspan="5" align="center">A. Learning Materials</td></tr>
<tr><td>1.</td><td>TTLM</td><td>Containing: Learning guide, teachers guide and Assessment Packet</td><td>1</td><td>1:25</td></tr>
<tr><td colspan="5" align="center">B. Learning Facilities & Infrastructure</td></tr>
<tr><td>1.</td><td>Lecture Room</td><td>Area- 7m*8m</td><td>1</td><td>1:25</td></tr>
<tr><td>2.</td><td>Library</td><td>Area- 30mX30m</td><td>1</td><td>1:25</td></tr>
<tr><td colspan="5" align="center">C. Consumable Materials</td></tr>
<tr><td>1.</td><td>Paper</td><td>A4</td><td>1dusta</td><td>1:25</td></tr>
<tr><td>2</td><td>Marker</td><td>Non-permanent white board marker</td><td>2</td><td>2:25</td></tr>
<tr><td colspan="5" align="center">D. Tools and Equipments</td></tr>
<tr><td>1.</td><td>Computer</td><td>
- 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
</td><td>1</td><td>1:25</td></tr>
<tr><td>2.</td><td>LCD Projector</td><td>
- 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
</td><td>1</td><td>1:25</td></tr>
</table>

LEARNING MODULE 03

TVET-PROGRAMME TITLE: **Textile Chemical Processing Technology Level V**
MODULE TITLE : **Preparing procedures and specifications for processing textiles**
MODULE CODE : **IND TPT5 M03 0222**
NOMINAL DURATION : **70 Hours**
MODULE DESCRIPTION : This unit covers the knowledge, skills and attitudes required to prepare and confirm workplace practices for use in a textile processing to interpret and apply procedures and specifications related to within a textile processing manufacturing unit.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Identify relevant requirements **LO2.** Prepare specifications **LO3**. Prepare standard operating procedures or manuals **LO4.** Review procedures and specifications against standards **LO5.** Maintain records

MODULE CONTENTS:

LO1. Identify relevant requirements

    1.1. Identifying and assembling standard operating procedures information

    1.2. Establishing and confirming formats and specification

    1.3. Interpreting textile formulas and terminology

    1.4. Analyzing information needs of audience or team members

LO2. Prepare specifications

    2.1. Writing specifications in an appropriate format

    2.2. Incorporating special specification requirements

LO3. Prepare standard operating procedures or manuals

    3.1. Collecting, reviewing and interpreting operating procedure information

    3.2. Preparing SOP documentation

    3.3. Assigning or designating procedure or manuals updates responsibility

LO4. Review procedures and specifications against standards

    4.1. Monitoring procedures and specification compliance

    4.2. Assessing, reporting and acting results

LO5. Maintain records

    5.1. Maintaining procedures and specifications records

    5.2. Making production performance and developments presentation

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

ASSESSMENT CRITERIA:

LO1. Identify relevant requirements

▪ Information required for standard operating procedures for the textile operation is identified and assembled

▪ Specification requirements and format are established and confirmed and textile formulas and terminology interpreted

▪ Information needs of audience or team members is analyzed

LO2. Prepare specifications

▪ Specifications are written in an appropriate format for the textile operation, to ensure requirements can be met

▪ Special requirements are incorporated into the specifications

▪ Specifications are written in a manner that is clear and understood in the workplace

LO3. Prepare standard operating procedures or manuals

▪ Information needed to establish the operating procedures or manual is collected, reviewed and interpreted in accordance with WHS practices

▪ Documentation is prepared to formalize processes for achieving the processing unit objectives

▪ Responsibility for all updates and changes to the procedures or manuals is assigned or designated

LO4. Review procedures and specifications against standards

▪ Compliance with the procedures and specification requirements is monitored in relation to the required application

▪ Results are assessed, reported and acted upon according to workplace practices

LO5. Maintain records

▪ Records of procedures and specifications are maintained and associated reports prepared, where necessary, in accordance with workplace practices

▪ Presentations on production performance and developments are made at management meetings in accordance with workplace practices

Annex: Resource Requirements

IND TPT5 M03 0222: Preparing procedures and specifications for processing 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	1:25
2.	Reference Books			
2.1	Chemistry & Technology of Fabric Preparation & Finishing	Dr. Charles Tomasino	5	1:5
B. **Learning Facilities & Infrastructure**				
1.	Lecture Room	Area- 7m*8m	1	1:25
3.	Library	Area 30*30m	1	1:25
C. **Consumable Materials**				
1.	Paper	A4	1dusta	1:25
2	Marker	Non-permanent white board marker	2	2:25
D. **Tools , equipment and machineries**				
1.	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	1:25
2.	LCD Projector	- Compatible Operating System: Android and Windows operating systems - Native Resolution: 1920x1080	1	1:25

		- 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		

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

MODULE TITLE: Producing screen printed textiles and perform screen printing troubleshooting

MODULE CODE: **IND TPT5 M04 0222**

NOMINAL DURATION: **120Hours**

MODULE DESCRIPTION: This module covers the skills and knowledge required to apply screen printing techniques used to produce screen print designs on textiles and performing necessary actions to find causes and giving possible remedies.

LEARNING OUTCOMES

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

LO1. Interpret production requirements

LO2. Apply screen printing procedure

LO3. Produce Textile printed sample

MODULE CONTENTS:

LO1. Interpret production requirements

    1.1 Analyzing and discussing print design specifications with appropriate personnel

    1.2 Identifying screen printing desired effects

    1.3 Selecting printing technique and design outcome

    1.4 Selecting textile substrates and quantities

    1.5 Selecting stencil techniques and types

    1.6 Selecting masters and screen types

    1.7 Selecting meshes types

    1.8 Selecting print medium

LO2. Apply screen printing procedure

    2.1 Setting up workstation, tools and equipment

    2.2 Checking and preparing substrates

    2.3 Preparing stencil masters, meshes and screens

    2.4 Preparing printing set up

    2.5 Applying screen printing techniques

    2.6 Applying printing OHS practices

LO3. Produce Textile printed sample

    3.1 Checking print strike off

3.2 Identifying and determining printing faults and production problems causes

3.3 Analyzing printing process, technique and medium used

3.4 Printing sample

3.5 Finishing screen print, examining print outcomes and completing housekeeping

3.6 Completing required documentation

Learning Methods:

- Lecture and Discussion
- Démonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Interpret production requirements

- Design specifications are analysed and discussed with appropriate personnel to confirm production requirements
- Desired effects of screen printing are identified and appropriate printing technique selected to achieve required design outcome
- Textile substrates and quantities are selected according to design requirements
- Stencil techniques, stencil types, masters, screen types, meshes and medium are selected according to requirements of printing technique, substrate and design

LO2. Apply screen printing procedure

- Workstation, tools and equipment are set up according to specifications for work.
- Substrates are prepared and checked against quality standards
- Stencil masters, meshes and screens are prepared for printing according to requirements for selected printing technique.
- Printing set up is prepared.
- Screen printing techniques are applied to meet design specifications for sample and according to OHS practices

LO3. Produce Textile printed sample

- Strike off is checked against design specifications to ensure quality standards are met
- Printing faults and production problems are identified and causes determined to keep the given quality standards.
- Printing process, technique and medium used are analysed to determine necessary modifications to printing techniques, processes or materials
- Sample is printed
- Screen print is finished and housekeeping completed
- Outcomes are examined with appropriate personnel and possible
- Required documentation is completed

Annex: Resource Requirements

IND TPT5 M04 0222: Producing screen printed textiles and perform screen printing troubleshooting				
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	1:25
2	Reference book			
2.1	Textile Printing	Edited by Leslie W C Miles Revised Second Edition	5	1:5
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.	Screen coaters tool	▪ Type: Dual Edge Emulsion Scoop Coater ▪ Size: 8" (20.5cm) ▪ Material: Aluminum alloy ▪ Featured Refinements: Screen Printing Press	5	1:5
3.	Tape /scotch	▪ Length: 65 Meter ▪ Width: 2" ▪ Features: Water Proof	1	1:25
4.	Dyes	Group – A disperse dye	1kg each for basic color	1:25
		Plastisol dye	1kg for each basic color	1:25
		Direct dye	1kg each basic color	1:25

5.	Binders	▪ Packaging type: Drum ▪ Packaging size: 50kg/200kg ▪ Application: for textile printing ▪ Form: liquid ▪ Color: white	1kg	1:25
6.	Cross linking agent	▪ Appearance: Transparent liquid ▪ Sterility: Sterile ▪ PH: 6.5 – 7.4	5L	1:5
7.	Screen-cleaning chemicals	▪ water-dilutable or water-based ink cleaner ▪ Without damaging the polyester fabrics ▪ Contains no hydrocarbon ▪ Odorless	5L	1:5
8.	Marker	Non-permanent white board marker	1	1:25
9.	Fabric	Any bleached knitted or woven fabrics	75m	5:1
10.	Screen frame	Timber or steel or aluminium framed	5m each	1:5
D. Tools and Equipments				
1.	Digital weighing balance	320g 0.1mg precision electronic analytical balance	1	1:25
2	Spoon	Laboratory Spoon Spatula 150mm, stainless steel	5	1:5
3.	Rulers and measuring tape	▪ Material: Plastic ▪ Purpose: Laser Measure Size: 120mmx93mmx41mm (LxWxH) ▪ Tape Measure Length: 7.5M ▪ Power Supply: 1.5V(AG13)x3 ▪ Wave Length: 630-680nm ▪ Horizontal Accuracy: 0.25mm/m ▪ Vertical accuracy: 0.5mm/m	5	1:5

4.	Hammer	▪ Head width: 30mm ▪ Head length: 165mm ▪ Ergonomic handle ▪ Nail puller ▪ Hardened tempered head	5	1:5
5.	Squeegees	▪ Material: Aluminium,rubber ▪ Hardness: 75 ▪ Color: Silver ▪ Size: 10/20/30/40cm	5	1:5
6.	Scissor	▪ Blade Material: ▪ High carbon stainless steel ▪ Blade Size: ▪ 100mm,90mm,70mm	5	1:5
7.	Fans / foam dryer	▪ Voltage: 220V ▪ Power: 2200W ▪ Speed setting : cold wind and warm air ▪ Motor: DC Motor ▪ Spare parts: 2pcs of nozzles (free)	5	1:5
8.	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	1:5
9.	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	1	1:25

		Port			
		– Maximum RAM Capacity: 48 GB			
		– Hard Drive Capacity: 500 GB			
		– Max Turbo Frequency: 3.33 Ghz			
10.	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	1:25	

LEARNING MODULE 05
TVET-PROGRAMME TITLE: **Textile Processing Technology Level V**
MODULE TITLE: **Analyzing use of color in textiles**
MODULE CODE: **IND TPT5 M05 0222**
NOMINAL DURATION: **100Hours**
MODULE DESCRIPTION: This module covers the skills and knowledge to analyse and apply colour theory to the design process for textile products.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Analyze effects of color used in textiles **LO2.** Analyze suitable color combinations for use in textile design **LO3.** Consider use of color in textile design

MODULE CONTENTS:
 	
LO1. Analyze effects of color used in textiles
 	
  1.1 Examining color Effects dimensions
 	
  1.2 Identifying color theory and textile design process relationship
 	
  1.3 Analyzing color visual or optical effects
 	
  1.4 Collecting and comparing textile products samples
 	
LO2. Analyze suitable color combinations for use in textile design
 	
  2.1 Developing color combinations
 	
  2.2 Using color wheel and color charts
 	
  2.3 Identifying and illustrating new color schemes
 	
LO3. Consider use of color in textile design
 	
  3.1 Identifying and comparing color uses
 	
  3.2 Investigating color forecasting options
 	
  3.3 Documenting color investigations

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

ASSESSMENT CRITERIA:

LO1. Analyse effects of colour used in textiles

- Effects of colour dimensions are examined.

- Relationship of colour theory to textile design process is identified.

- Visual or optical effects of colour are analysed.

- Samples of textile products that demonstrate different visual effects are collected and compared

LO2. Analyse suitable colour combinations for use in textile design

- Colour combinations are developed using computer software or manual processes

- Colour wheel and colour charts are used to assist colour investigations

- New colour schemes are identified and illustrated

LO3. Consider use of colour in textile design

- Different colour uses are identified and compared for impact.

- Colour forecasting options are investigated.

- Colour investigations are documented for future reference.

IND TPT5 M05 0222: Analyzing use of color in 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	1:25
2	Color for textiles A user's handbook	Wilfred Ingamells PhD MSc CText FTI CCol FSDC	5	1:5
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
3.	White board marker	Non-permanent white board marker	2	2:25
5.	Marker	Containing 12 different colors	5	1:5
D. **Tools and Equipments**				
1.	Color wheel	Containing 12 colors	1	1:25
2	Spectro – colorimeter or Digital Colorimeter	▪ Color space: CIELAB ▪ Color difference formula: ΔE*ab ▪ Measurement caliber: Φ8mm ▪ Illumination Condition: CIE ▪ Recommendation: 8/d ▪ Light source: D65 ▪ Sensor: Photodiode array ▪ Observer: CIE 10°standard observer ▪ Measurement range L: 0 -100 ▪ Repeated accuracy: ΔE < 0.1 ▪ Storage capacity standard sample: 100, sample: 10000 ▪ Display screen: TFT true color 2.8inch@(16:9) ▪ Language: English / Simplified Chinese		1:5

		▪ Working temperature range: 0℃ - 40℃ ▪ Storage temperature range: -20℃ - 50℃ ▪ Humidity range: relative humidity less than 85%, without condensation ▪ Battery charging time: 8 hours ▪ Size: 172*80*60mm ▪ Weight: 350g		
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 ▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz	1	1:25
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	1:25

LEARNING MODULE 06			
TVET-PROGRAMME TITLE: **Textile Processing Technology Level V**			
MODULE TITLE: **Identifying opportunities in the textile market**			
MODULE CODE: **IND TPT5 M06 0222**			
NOMINAL DURATION: **92Hours**			
MODULE DESCRIPTION: This module covers the skills and knowledge to conduct market research into textiles markets and identify opportunities for improving the performance or outcomes of a textile product which is produced at micro and small production scale.			
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Conduct market research **LO2.** Analyze textile market opportunities **LO3.** Conduct tests on textile concepts **LO4.** Prepare a strategic plan			
MODULE CONTENTS: **LO1. Conduct market research** 1.1 Selecting market research target and developing research parameters 1.1.1 Finished textile products 1.1.2 Textile supply chain components 1.1.3 Market segments 1.2 Planning and documenting market research activity and evaluation strategy 1.3 Conducting textile market research and documenting outcomes 1.4 Analyzing research findings and identifying potential opportunities **LO2. Analyze textile market opportunities** 2.1 Analyzing market research findings 2.2 Conducting market feasibility studies 2.3 Discussing market opportunities with textile supply chains members 2.4 Developing textile opportunities concepts 2.5 Applying marketing principles **LO3. Conduct tests on textile concepts** 3.1 Conducting input materials tests			

3.2 Applying textile materials and production processes technical knowledge

3.3 Developing sample product concept test

LO4. Prepare a strategic plan

4.1 Developing strategic plan

4.2 Presenting plan and finalizing strategic plan

Learning Methods:
- Lecture and Discussion   - Démonstration   - Simulation   - Role playing

Assessment Methods:
- Written test   - Oral questioning   - Practical demonstration

ASSESSMENT CRITERIA:

LO1. Conduct market research

- Target for market research is selected and research parameters developed
- Market research activity and evaluation strategy are planned and documented
- Research into textile market is conducted and outcomes documented
- Research findings are analyzed and potential opportunities identified

LO2. Analyze textile market opportunities

- Research findings are analyzed against domestic and global trends to assess impact on potential opportunities
- Feasibility studies are conducted to assess opportunities
- Opportunities are discussed with team members and members of the Textile supply chain to gain feedback
- Concepts are developed to explore textile opportunities

LO3. Conduct tests on textile concepts

- Tests are conducted on input materials i.e. chemicals, fabrics, finished products or processes to assess viability of concepts
- Technical knowledge of textile materials and production processes is applied to test rigor of concepts
- Sample products are developed to test concepts with key personnel and target market

LO4. Prepare a strategic plan

- A strategic plan for mass production and marketing, including budget, is developed to explore finished textile market opportunities
- Plan is presented to key personnel to gain feedback and support
- Strategic plan is finalized

IND TPT5 M06 0222: Identifying opportunities in the textile market				
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	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	Non-permanent white board marker	2	2:25
E. Tools and Equipments				
1.	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	1:25
2.	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	1:25

LEARNING MODULE 07
TVET-PROGRAMME TITLE: **Textile Chemical Processing Technology Level V**
MODULE TITLE : **Managing environmental Impact of Textile processing**
MODULE CODE : **IND TPT5 M07 0222**
NOMINAL DURATION : **60 Hours**
MODULE DESCRIPTION : This competence covers managing waste and environmental threats from textile processing units. It covers all resources used and products made by the units to develop and implement improvements within processing units.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1.** Develop resource conservation practices and procedures **LO2.** Develop pollution management practices and procedures **LO3**. Develop waste management practices and procedures
MODULE CONTENTS: **LO1. Develop resource conservation practices and procedures**   1.1 Identifying nature and primary resources   1.2 Determining impact of depletion resources   1.3 Identifying high yield resources   1.4 Developing resources consumption reduction methods   1.5 Accomplishing required documentation   **LO2. Develop pollution management practices and procedures**   2.1 Determining nature of pollutants in textile processing units   2.2 Determining pollutants impact   2.3 Identifying reduced pollutants benefit   2.4 Developing pollutant reduction methods   2.5 Accomplishing required documentation   **LO3. Develop waste management practices and procedures**   3.1. Identifying nature and sources wastes   3.2. Determining and describing wastes impact

3.3. Determining wastes reduction benefit

3.4. Developing waste reduction methods

3.5. Accomplishing required documentation

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

ASSESSMENT CRITERIA:

LO1. Develop resource conservation practices and procedures

- Nature and primary source of resources used in the textile processing units are identified
- Impact of the depletion of these resources on the environment and society are determined
- Resources that will yield a greater benefit from their conservation are identified
- Methods to reduce the consumption of these resources are developed
- Required documentation to implement change is accomplished in accordance with workplace procedures

LO2. Develop pollution management practices and procedures

- Nature of pollutants produced by textile processing units and their sources within the units are determined
- Impact of these pollutants in the environment and society are determined
- Pollutants that will yield a greater benefit from their reduction is identified
- Methods to reduce the production of this pollutant is developed
- Complete required documentation to implement change is accomplished in accordance with workplace procedures.

LO3. Develop waste management practices and procedures

- Nature and sources of wastes produced by the unit are identified
- Impact of these wastes on the environment and society are determined and described
- Wastes those yield a greater benefit from their reduction is determined
- Methods of waste reduction is developed
- Complete required documentation to implement change is accomplished in accordance with workplace procedures

IND TPT5 M07 0222: Managing environmental Impact of Textile processing				
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	1:25
2.	Journals			
3.1	Environmental Impact of Textile and Clothing Industry,	Sajn N. European Parliamentary Research Service, Members' Research Service. PE 633.143. 2019. pp. 1-10	5	1:5
3.2	Introductory Chapter: Textile Manufacturing Processes	Faheem Uddin	5	1:5
B. Learning Facilities & Infrastructure				
1.	Lecture rooms with full facilities	8m*7m	1	1:25
2.	Library	30m*30m	1	1:25
C. Consumable Materials				
1.	Paper	A4	1dusta	1:25
2	Marker	Non-permanent white board marker	2	2:25
D. Tools , equipment and machineries				
9	Laptop computer	Hp 8 GB ram	1	1:25

10	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	1:25
11	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	1:25

Acknowledgements

The **Ministry of Labor and Skills** wishes to thank and appreciation for the trainers who donated their effort and time to develop this outcome based curriculum for the TVET Program **Textile processing Technology Level V**.

We also thank all regional Labor and Skill/TVET Bureaus, Ministry of labor and skills coordinators, all instructors who developed this curriculum for active facilitation of this curriculum development.

The trainers who developed the curriculum

No	Name	Qualification	Educational background	Region	College	Mobile number	E-mail
1	Tahir Abiyo	Msc	MED in Textile Technology	Oromia	Athlete Kenenisa Polytechnic college	0910605550	tahirdiba95@gmail.com
2	Tambizot Getachew	Masters	M.Tech in Fibres and textile processing technology	Addis Ababa	ETIDI	0936694972	tambizotgetachew10@gmail.com
3	Robel Legese	Masters	MSC in Textile Chemistry	Addis Ababa	Ethiopian Technical Institute	0910447294	robellegese1@gmail.com
4	Samueal Mohammed	Degree	BED in Textile Technology	Addis Ababa	General Wingate Polytechnic College	0910694912	samuealmoha2095@gmail.com
5	Asfaw Azene	Masters	MED in Textile Technology	Amhara	D/berhan Polytechnic college	0913852831	azeneasfaw2008@gmail.com
6.	Abreham Menchemo	Degree	Banking & Insurance	Hawassa	South TVET	0910066725	menchbet@gmail.com

Textile Processing Technology
Level- V

Version - I

March, 2022