

TEXTILE PROCESSING TECHNOLOGY LEVEL – III



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 III.

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 III

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 prepare and handle textile inputs used in Textile chemical processing, Perform Machine Setting for production Apply Cost Factors to Work Practices, Produce Textile Designs and Prototypes, Apply dyeing techniques to produce Indigenous textile designs, Apply printing techniques to produce indigenous textile designs, Organize and interpret tests 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 TPT3 011221 Prepare and handle textile inputs used in textile chemical processing

IND TPT3 02 1221 Perform Machine setting for production

IND TPT3 03 1221 Apply cost factors to work practices

IND TPT3 04 1221 Produce textile designs and prototypes

IND TPT3 05 1221 Apply dyeing techniques to produce Indigenous textile designs

IND TPT3 06 1221 Apply printing techniques to produce indigenous textile designs

IND TPT3 07 1221 Organize and interpret tests

1.4. Duration of the TVET-Program

The Program will have duration of **560 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		Cooperative Training	Total Hours	Remarks
		Training				
		Theory	Practical			
1.	Prepare and handle textile inputs used in Textile chemical processing	40	20	30	90	
2.	Perform Machine Setting for production	20	20	25	65	
3.	Apply Cost Factors to Work Practices	15	10	25	50	
4.	Produce Textile Designs and Prototypes	25	15	30	140	
5.	Apply dyeing techniques to produce Indigenous textile designs	25	45	25	95	
6.	Apply printing techniques to produce indigenous textile designs.	20	40	20	80	
7.	Organize and interpret tests	20	10	10	40	
Total		165	160	165	560	

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 III.

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 TPT3 01 1221 Prepare and handle textile inputs used in Textile chemical processing	IND TPT3 M01 0222 Preparing and handling textile inputs used in Textile chemical processing	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Identify storage procedures for inputs ▪ Identify hazards and risk control measures associated with inputs ▪ Prepare inputs ▪ Store inputs 	90
IND TPT3 02 1221 Perform machine setting for production	IND TPT3 M02 0222 Performing machine Setting for production	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Determine required specifications ▪ Set machine ▪ Conduct sample or trial runs and readjust ▪ Investigate and identify machine operating problems ▪ Communicate information 	65
IND TPT3 03 1221 Apply cost factors to work practices	IND TPT3 M03 0222 Applying cost factors to work practices	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Identify major cost components of production process ▪ Identify constraints to cost efficiency ▪ Apply cost efficient work practices 	50
IND TPT3 04 1221 Produce textile designs and prototypes	IND TPT3 M04 0222 Producing textile designs and prototypes	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Setup work station & develop design concepts ▪ Evaluate commercial production factors ▪ Design or modify existing model 	140

			<ul style="list-style-type: none"> ▪ Present textile designs for approval ▪ make prototype and Produce textile design sample ▪ Test prototype and product sample to evaluate, prototype, design and production processes ▪ Make samples and finalize textile design 		
IND TPT3 05 1221	Apply dyeing techniques to produce indigenous textile designs	IND TPT3 M05 0222	Applying dyeing techniques to produce indigenous textile designs	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Prepare for dyeing ▪ Dye fabrics ▪ Assess quality of product delivered ▪ Review dyeing process 	95
IND TPT3 06 1221	Apply printing techniques to produce indigenous textile designs	IND TPT3 M06 0222	Applying printing techniques to produce indigenous textile designs	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Prepare for printing Indigenous textile designs ▪ Print fabric ▪ Assess quality of product delivered ▪ Review design and printing process 	80
IND TPT3 07 1221	Organize and interpret tests	IND TPT3 M07 0222	Organizing and interpret tests	<ul style="list-style-type: none"> ▪ Determine job requirements ▪ Select sample ▪ Organise test results ▪ Interpret test results ▪ Report on analysed test results 	40

*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 and who have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE 01

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

MODULE TITLE: Preparing and handling textile inputs used in textile chemical processing

MODULE CODE: **IND TPT3 M01 0222**

NOMINAL DURATION: 90 Hours

MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes to handle and prepare Chemical, auxiliaries and textile materials used in Chemical processing of textiles.

LEARNING OUTCOMES

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

- LO1.** Determine job requirements
- LO2.** Identify storage procedures for inputs.
- LO3.** Identify hazards and risk control measures associated with inputs
- LO4.** Prepare inputs
- LO5.** Store inputs

MODULE CONTENTS:

LO1. Determine job requirements

- 1.1. Standard operating procedures (SOPs)
- 1.2. Complying with work health and safety (WHS)
- 1.3. Using personal protective equipment (PPE)
- 1.4. Identifying job requirements

LO2. Identify storage procedures for inputs

- 2.1. Identifying input location
- 2.2. Identifying storage conditions
- 2.3. Identifying storage and access documentation requirements
- 2.4. Identifying stored inputs workplace practices
- 2.5. Identifying stored inputs housekeeping requirements

LO3. Identify hazards and risk control measures associated with inputs

- 3.1. Identifying hazards associated with inputs
- 3.2. Identifying emergency procedures
- 3.3. Identifying risk control measures
- 3.4. Identifying special chemicals and auxiliaries handling procedures

LO4. Prepare inputs

- 4.1. Identifying product inputs required
- 4.2. Identifying inputs specifications
- 4.3. Confirming inputs mixing or preparing procedures
- 4.4. Preparing and directing chemical & auxiliaries to next process
- 4.5. Reporting spillages or incidents

LO5. Store inputs

- 5.1. Storing inputs
- 5.2. Finalizing store documentation
- 5.3. Clearing spillages

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. Identify storage procedures for inputs

- Location and storage conditions for inputs are identified based on the property of the substance
- Storage and access documentation requirements are identified based on the location and storage condition
- Workplace practices for accessing stored inputs are identified
- Housekeeping requirements for stored inputs are identified based on the property of the inputs.

LO3. Identify hazards and risk control measures associated with inputs

- Hazards associated with the handling and uses of inputs used in the workplace are identified based on safety data sheet of the chemicals and auxiliaries.
- Emergency procedures for workplace are identified
- Risk control measures associated with input are identified based on the nature of the substances.
- Personal protective equipment to be used when working with substances is identified based on the associated with the substance
- Special handling procedures for chemicals and auxiliaries are identified

LO4. Prepare inputs

- Inputs required for production processes are identified based on the product
- Specifications for required inputs are identified
- Mixing or preparing procedures are confirmed based on the type of inputs to be used
- Chemical and auxiliaries are prepared according to work health and safety (WHS) requirements
- Inputs are directed to next process
- Spillages or incidents are reported to appropriate personnel

LO5. Store inputs

- Inputs are stored according to storage requirements
- Required documentation is completed
- Spillages are cleared according to workplace practices and housekeeping requirements completed

Annex: Resource Requirements

IND TPT3 M01 0222 : Preparing and handling textile inputs used in textile chemical 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/Publication/Magazines			
2.1	Best practices in chemical management for textile manufacturing	By: Doug Cahn & Robert Clifford; Inter-American Development Bank 2014	1	1:25
2.2	Environmental, health, and safety guidelines for textile manufacturing	Environmental, health, and safety guidelines; Textile manufacturing, world bank group April 30, 2007	1	1:25
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.	Soap	200gm	25	1:1
2.	Gloves	Medical type	125	1:5
3.	Face mask	Medical type	125	1:5
D. Tools and equipment				
1.	Workshop (laboratory)	Textile processing	1	1:25
2	Demonstration site	Any textile processing unit/pilot plant	1	1:25

LEARNING MODULE 02

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

MODULE TITLE: Performing machine setting for production

MODULE CODE: **IND TPT3 M02 0222**

NOMINAL DURATION: 65 Hours

MODULE DESCRIPTION: This module covers the skills and knowledge required to set machines for product changes and resetting them when necessary

LEARNING OUTCOMES

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

- LO1.** Determine job requirements
- LO2.** Determine required specifications
- LO3.** Set machine
- LO4.** Conduct sample or trial runs and readjust
- LO5.** Investigate and identify machine operating problems
- LO6.** Communicate information

MODULE CONTENTS:

LO1. Determine job requirements

- 1.1. Standard operating procedures (SOPs)
- 1.2. Identify job requirements

LO2. Determine required specifications

- 2.1. Identifying and Interpreting raw materials, product and machine specifications

LO3. Set machine

- 3.1. Maintaining setting conditions
- 3.2. Cleaning and setting machine

LO4. Conduct sample or trial runs and readjust

- 4.1. Checking machine operation
- 4.2. Producing and checking sample
- 4.3. Adjusting machine setting

LO5. Investigate and identify machine operating problems

- 5.1. Diagnostic procedures and tests
- 5.2. Identifying and reporting major problems
- 5.3. Identifying and rectifying minor product quality problems

LO6. Communicate information

6.1. Completing machine setting 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. Determine required specifications

- Specifications for raw materials, product and machine are identified
- Specifications is interpreted for application in the testing and setting up process

LO3. Set machine

- Machine is cleaned and set in accordance with raw material and product specifications and machine manufacturer and workplace procedures
- During setting and testing, condition of work area around machine is maintained to meet workplace and work health and safety (WHS) requirements

LO4. Conduct sample or trial runs and readjust

- Machine operation is checked to ensure correct operation
- Where appropriate, a sample is produced and checked for conformance with workplace requirements and product standards and further adjustment is made until sample meets specifications

LO5. Investigate and identify machine operating problems

- Appropriate diagnostic procedures and tests are used to locate and identify faults in the machine
- Major problems in machine are identified and reported
- Minor product quality problems, which are within the production system are identified and rectified

LO6. Investigate and identify machine operating problems

- Records and other documentation of setting and maintenance work are clearly and accurately completed

Annex: Resource Requirements

IND TPT3 M02 0222 : Performing machine setting for 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	Developing a standard pre-setup procedure for machines	Aswin Ravikumar & Shreyank Ramalingaiah; November 2018	1	1:25
2.2	An optimum procedure for setting machines or adjusting processes	FRANK E. GRUBBS Ballistic Research Laboratories, Aberdeen Proving Ground, Md	1	1:25
B. Learning Facilities & Infrastructure				
1.	Lecture rooms with full facilities	8m*7m	1	1:25
2.	Library	30m*30m	1	1:25
3	Textile processing facility	Any textile processing unit/pilot plant	1	1:25
4	Workshop (laboratory)	Textile	1	1:25

		processing		
<i>C. Consumable Materials</i>				
1.	Soap	200gm	25	1:1
2.	Gloves	Medical type	125	5:1
3.	Face mask	Medical type	125	5:1
<i>D. Tools and Equipments</i>				
1.	Machine setting manuals and kits	According to specific textile processing machine	1	1:25

LEARNING MODULE 03

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

MODULE TITLE: **Applying Cost Factors to Work Practices**

MODULE CODE: **IND TPT3 M03 0222**

NOMINAL DURATION: **50** Hours

MODULE DESCRIPTION: This modules covers the knowledge and skills needed for an individual to identify cost components and to be able to determine the cost impacts and alternative actions/practices.

LEARNING OUTCOMES

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

- LO1.** Determine job requirements
- LO2.** Identify major cost components of production process
- LO3.** Identify constraints to cost efficiency
- LO4.** Apply cost efficient work practices

MODULE CONTENTS:

LO1. Determine job requirements

- 1.1. Standard operating procedures (SOPs)
- 1.2. Identifying job requirements

LO2. Identify major cost components of production process

- 2.1. Identifying production process cost components
 - 2.1.1. Fixed costs
 - 2.1.2. Variable costs
- 2.2. Recognizing alternative actions cost impact

LO3. Identify constraints to cost efficiency

- 3.1 Identifying costs factors raised from individual and teams
- 3.2 Relating costs factors on overall cost of production
 - 3.2.1 Direct costs
 - 3.2.2 Indirect costs
 - 3.2.3 Overhead costs
- 3.3 Identifying cost efficiency factors

LO4. Apply cost efficient work practices

- 4.1 . Possible actions in improving cost efficiency

4.2 . Identifying proposed change's non-financial implications

4.3 . Selecting actions which minimize overall costs

4.4 . Monitoring actions to ensure cost efficiency

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. Identify major cost components of production process

- Identify cost components in the production process
- Recognize the impact of existing or alternative actions on costs

LO3. Identify constraints to cost efficiency

- Identify costs factors under the control of the individual or team
- Relate identified costs factors to impact on overall cost of production/process
- Identify cost factors that are constraints to cost efficiency in own work area

LO4. Apply cost efficient work practices.

- Express the implications of possible actions/changes to improve cost efficiency in simple financial terms
- Identify non-financial implications of proposed changes in discussion with relevant people
- Select actions which minimize overall costs
- Monitor actions to ensure cost efficiency in own work area is maintained

Annex: Resource Requirements

IND TPT3 M03 0222: Applying Cost Factors to Work Practices				
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	Costs of compliance with health and safety regulations in SME's	Bush Loan Penicuik Midlothian EH26 0PZ	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.	Marker	Non-permanent white board marker	2pack	2:25
D. Tools and Equipments				
4	Computer	<ul style="list-style-type: none"> ▪ 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	1:25

		<ul style="list-style-type: none"> ▪ Connectivity: USB 2.0, Display Port ▪ Maximum RAM Capacity: 48 GB ▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz 		
5	LCD Projector	<ul style="list-style-type: none"> ▪ 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 04

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

MODULE TITLE: **Producing Textile Designs and Prototypes**

MODULE CODE: **IND TPT3 M04 0222**

NOMINAL DURATION: **140** Hours

MODULE DESCRIPTION: This module covers the knowledge, attitudes and skills to create and produce textile design and prototypes for marketing purposes. It includes development of product design, making prototypes and production of textile product sample.

LEARNING OUTCOMES

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

- LO1.** Determine job requirements
- LO2.** Setup work station & develop design concepts
- LO3.** Evaluate commercial production factors
- LO4.** Design or modify existing model
- LO5.** Present textile designs for approval
- LO6.** Make a prototype and Produce textile design sample
- LO7.** Test prototype and product sample to evaluate, prototype, design and production processes
- LO8.** Make samples and finalize textile design

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 and implementation
 - 1.2.3. Risk reduction measures
- 1.3. Identifying job requirements

LO2. Setup work station & develop design concepts

- 2.1. Setting up workstation
- 2.2. Applying market analysis information
- 2.3. Developing design brief with consulting team
- 2.4. Conducting design brief test
- 2.5. Confirming and documenting product development design brief and specification

2.6. Developing design concepts

LO3. Evaluate commercial production factors

- 3.1. Determining scope of commercial production
- 3.2. Consulting appropriate personnel
- 3.3. Estimating and comparing costs
- 3.4. Comparing and analyzing commercial production variables

LO4. Design or modify existing model

- 4.1 Interpreting customer requirement specifications
- 4.2 Designing components
- 4.3 Selecting Fabrics, garments, dyes, pigments, Chemicals & auxiliaries
- 4.4 Modifying the existing model
- 4.5 Following liaison with relevant departments

LO5. Present textile designs for approval

- 5.1 Drafting textile product designs
- 5.2 Presenting, reviewing and modifying textile designs
- 5.3 Accepting and confirming final textile design
- 5.4 Completing relevant documentation

LO6. Make prototype and Produce textile design sample

- 6.1. Coordinating prototyping
- 6.2. Obtaining and testing components and resources
- 6.3. Technical production aspects
- 6.4. Completing specification sheet
- 6.5. Developing production plan
- 6.6. Producing textile sample

LO7. Test prototype and product sample to evaluate, prototype, design and production processes

- 7.1 Reviewing prototype with customer specifications
- 7.2 Evaluating textile sample against design specifications
- 7.3 Testing and evaluating textile sample and production process
- 7.4 Confirming and processing overall design evaluation

LO8. Make samples and finalize textile design

- 8.1. Making marketing samples
- 8.2. Discussing textile sample design evaluation

8.3. Design and production process modifications

8.4. Confirming and documenting final design

Learning Methods:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

Assessment Methods:

- Written test
- Oral questioning
- Practical demonstration

Annex: Resource Requirements

IND TPT3 M04 0222: Producing Textile Designs and Prototypes				
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 Design Products and Processes	Michael Hann, 2020 1 st edition	5	1:5
B.	Learning Facilities & Infrastructure			
1.	Lecture Room	Area- 7m*8m	1	1:25
2.	Library	Area- 30X30m	1	1:25
C.	Consumable Materials			
1.	Paper	A4	1dusta	1:25
2.	Marker	Non-permanent white board marker	2pack	2:25
D.	Tools and Equipments			
1	Computer	<ul style="list-style-type: none"> ▪ 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

		<p>Port</p> <ul style="list-style-type: none"> ▪ Maximum RAM Capacity: 48 GB ▪ Hard Drive Capacity: 500 GB ▪ Max Turbo Frequency: 3.33 Ghz 		
2	LCD Projector	<ul style="list-style-type: none"> ▪ 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 III

MODULE TITLE: **Applying dyeing techniques to produce Indigenous textile design**

MODULE CODE: **IND TPT3 M05 0222**

NOMINAL DURATION: 95 Hours

MODULE DESCRIPTION: This module of competency covers the skills, knowledge and attitude required to apply dyeing techniques to produce Indigenous textile designs that could accommodate the image use, design protocols and techniques specific to different Ethiopian communities, this work may be conducted in small to large scale enterprises and may involve individual and team activities.

LEARNING OUTCOMES

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

- LO1.** Determine job requirements
- LO2.** Prepare for dyeing
- LO3.** Dye fabrics
- LO4.** Assess quality of product delivered
- LO5.** Review dyeing process

MODULE CONTENTS:

LO1. Determine job requirements

- 1.1 Standard operating procedures (SOPs)
- 1.2 Complying with work health and safety (WHS)
- 1.3 Using personal protective equipment (PPE)
- 1.4 Identifying job requirements

LO2. Prepare for dyeing

- 2.1 . Identifying and applying design protocols
- 2.2 .Developing single or multi colour dyeing design
- 2.3 Identifying and preparing dyeing fabric
- 2.4 Identifying and preparing dyeing technique
- 2.5 Identifying and preparing dye type
- 2.6 Selecting dye formula, measuring and mixing dyes
- 2.7 Preparing tools and equipment

2.8 Confirming dye recipe

LO3. Dye fabrics

3.1 Applying dyeing technique

LO4. Assess quality of product delivered

4.1 Checking product quality standard

4.2 Evaluating product quality parameters

4.3 Identifying faults causes and taking corrective actions

LO5. Review dyeing process

5.1 Assessing dyeing outcome

5.2 Modifying dyeing techniques

5.3 Achieving design 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. Prepare for dyeing

- Identify and apply protocols for developing culturally-specific design
- Develop single or multicolour dyeing design suitable for cultural context and chosen fabric
- Identify and prepare suitable fabric, dyeing technique and dye type
- Select dye formula, measure and mix dyes to achieve desired result
- Prepare tools and equipment
- Use swatches of dyed fabric to experiment with and confirm dye recipe

LO3. Dye fabrics

- Apply dyeing technique to produce desired dyed fabric according to WHS practices
- Use tools and equipment effectively and safely to achieve desired dyed fabric result.
- Complete work systematically with attention to detail

LO4. Assess quality of product delivered

- Product quality delivered checked against organization quality standards and specifications.
- Product delivered are evaluated using the appropriate evaluation quality parameters and in accordance with organization standards.
- Causes of any identified faults are identified and corrective actions taken in accordance with organization policies and procedures.

LO5. Review dyeing process

- Assess outcome of dyeing
- Modify dyeing techniques as required
- Records and other documentation of achieved design.
- Clean and store materials and equipment

Annex: Resource Requirements

IND TPT3 M05 0222: Applying dyeing techniques to produce Indigenous textile design				
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	Textile Manufacturing Processes	Faheem Uddin, (August 28th, 2019), reviewed June 11th, 2019P	1	1:25
2.2	Textile manufacturing process	http://dx.doi.org/10.5772/intechopen.87968	1	1:25
2.3	Text Book & Practical Manual	Shiksha Kendra	1	1:25
2.4	Jose Cegarra and Punte, Dyeing of textile materials,	Texille, 1993	1	1:25
2.5	SK Karmakar, Chemical technology in the pretreatment process of textile materials,	Elsevier, 1999.	1	1:25
2.6	RB Chavan, Chemical processing of hand loom fabrics	1999	1	1:25
B. Learning Facilities & Infrastructure				
1.	Lecture rooms with full facilities	8m*7m	1	1:25
2.	Library	30m*30m	1	1:25
3	Work shop	30m*30m	1	1:25
C. Consumable Materials				
1.	Paper	A4		1:25
2	Marker	Non-permanent white board marker	1 pack	1:25
3	Yarn.	Cotton, Wool, polyester, Nylon, Acrylic etc	1 K	1:25

			g	
4	Fabrics	Knitted, Woven and Non-woven etc.	1 0 m	2:25
5	Salt	Hardness: 150mg-400mg/ l Packing wt: 50Kg Color: White Grade: Industrial Type: Dyeing	1 K g	1:25
5.	Direct dye	Form: powder Solubility: soluble in water Solid content: 90 – 95% Usage: textile industry	1 K g	1:25
6.	Reactive dye	Form: powder PH 1% solution: 7.85 Solubility: 90° c- 50g/l Solid content: 90 – 95% Usage: wool, nylon, cotton	1 K g	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	1 K g	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	1 K g	1:25
<i>D. Tools and Equipments</i>				
1.	Digital balance	Weighing Capacity: 220 gm Pan size: 80mm, power supply: 12V Division:0.0001g/0.1mg Wind glass	5	1:5

2	Beaker	Capacity 50 ml	Diameter 4cm	Height 6cm	5	1:5
		100 ml	5cm	7cm		
		250 ml	6cm	10cm		
		500 ml	8cm	12cm		
3	Pipet	Material: polystyrene Length: 348mm Capacity: 5ml			5	1:5
4	Titrator	Water content: 0.1- 500mg H ₂ O Concentration: 10mg/l – 100% H ₂ O Volume: 10 ml burette, discharge +- 0.015mL, Repeatability +-0.005mL. Endpoint Detection: by polarized potential level detected with a twin platinum electrode.			1	1:25
5	Spoon	Laboratory Spoon Spatula 150mm, stainless steel			5	1:5
6	Thermometer	For kinematic viscosity Temperature range: 28.6 - 31.4°C Length: 300 - 310mm Scale: 0.05°C Immersion: Total immersion Material: Glass, mercury			5	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	1:5
8	Laptop computer	Hp 8 GB ram			1	1:25
9	Computer	<ul style="list-style-type: none"> ▪ 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 			1	1:25

		<ul style="list-style-type: none"> ▪ Max Turbo Frequency: 3.33 Ghz 		
10	LCD Projector	<ul style="list-style-type: none"> ▪ 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 III
MODULE TITLE: Applying printing techniques to produce indigenous textile design
MODULE CODE: IND TPT3 M06 0222
NOMINAL DURATION: 80 Hours
MODULE DESCRIPTION: This module of competency covers the skills, knowledge and attitude required to apply printing techniques to produce Indigenous textile designs that could accommodate the image use, design protocols and techniques specific to different Ethiopian communities, this work may be conducted in small to large scale enterprises and may involve individual and team activities.
<p>LEARNING OUTCOMES</p> <p>At the end of the module the trainee will be able to:</p> <p>LO1. Determine job requirements</p> <p>LO2. Prepare for printing Indigenous textile designs</p> <p>LO3. Print fabric</p> <p>LO4. Assess quality of product delivered</p> <p>LO5. Review design and printing process</p>
<p>MODULE CONTENTS:</p> <p>LO1. Determine job requirements</p> <p>2.1. Standardizing operating procedures (SOPs)</p> <p>2.2. Complying with work health and safety (WHS)</p> <p>2.3. Identifying job requirements</p> <p>LO2. Prepare for printing Indigenous textile designs</p> <p>2.1 Identifying and applying print design protocols</p> <p>2.2 Identifying fabric and printing technique</p> <p>2.3 Developing single or multi-colour print design</p> <p>2.4 Preparing printing inputs</p> <p>LO3. Print fabric</p> <p>3.1. Applying printing technique</p> <p>3.2. Using tools and equipment</p> <p>LO4. Assess quality of product delivered</p> <p>4.1 Checking and evaluating product quality standard</p>

4.2 Applying printed product quality parameters

4.3 Identifying faults causes and taking corrective actions

LO5. Review design and printing process

5.1. Assessing printing outcomes

5.2. Modifying design and technique

5.3 Records and other documentation of achieved design.

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 printing Indigenous textile designs

- Identify and apply protocols for developing culturally-specific designs
- Identify suitable fabric and printing technique
- Develop single or multi-colour design suitable for cultural context and chosen fabric or garment.
- Prepare fabric, garment, pigments/dyes/, auxiliaries, tools and equipment

LO3. Print fabric

- Apply printing technique to produce culturally printed fabric according to WHS practices
- Use tools and equipment effectively and safely to achieve desired culturally printed fabric result
- Complete work systematically with attention to detail

LO4. Assess quality of product delivered

- Product qualities delivered are checked against organization quality standards and specifications.
- Product delivered are evaluated using the appropriate evaluation quality parameters and in accordance with organization standards.
- Causes of any identified faults are identified and corrective actions taken in accordance with organization policies and procedures

LO5. Review design and printing process

- Assess outcome of printing
- Modify design and technique, as required
- Records and other documentation of achieved design.
- Clean and store materials and equipment

Annex: Resource Requirements

IND TPO3 M06 0222: Applying printing techniques to produce indigenous textile design				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	<i>Learning Materials</i>			
1.	TTLM	Containing learning guide, teachers guide and Assessment Packet	1	1:25
2.	Reference Books			
2.1	Textile Printing Technology Revised Second Edition	Leslie W C Miles	5	1:5
2.2	Introduction to Textile Printing	W.Clarke, B.Sc.Tech., A.M.CT.	5	1:5
B.	<i>Learning Facilities & Infrastructure</i>			
1.	Lecture rooms with full facilities	6m*7m	1	1:25
2.	Library	30m*30m	1	1:25
C.	<i>Consumable Materials</i>			
1.	Paper	A4	1 Dusta	1:25
2	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.			

<i>D.</i>		<i>Tools and Equipments</i>		
1.	Lap top Computer	Hp 8 ram	1	1:25
2	Projector	LED/ LCD display	1	1:25
3	Printing machine	• Contour Laser Cutter for Digital Printed Fabrics with Vision CCD Camera	1	1:25
		• CALCA 6 Color 6 Station Screen Printing Machine Press T-shirt Printer Carousel	1	1:25
		•4-color 1-station Silk screen printing machine T-shirt Press DIY Kit equipment	1	1:25
9	Computer	<ul style="list-style-type: none"> ▪ 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

LEARNING MODULE - 07	
TVET-PROGRAMME TITLE: Textile Processing Technology Level III	
MODULE TITLE: Organizing and interpret tests	
MODULE CODE: IND TPT3 M07 0222	
NOMINAL DURATION: 40 hours	
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. Select sample	
LO3. Organise test results	
LO4. Interpret test results	
LO5. Report on analysed test results	
MODULE CONTENTS:	
LO1. Determine job requirements	
1.1 Standard operating procedures (SOPs)	
1.2 Identifying job requirements	
LO2. Select sample	
2.1. Selecting material or product sample	
2.2. Determining and confirming testing sample acceptance criteria	
LO3. Organise test results	
3.1. Confirming testing requirements	
3.2. Organising tests	
LO4. Interpret test results	
4.1 Collecting and analysing test results	
4.2 Interpreting process or product requirements outcomes	
4.3 Reviewing acceptance criteria	
4.4 Taking action on test results	
LO5. Report on analysed test results	
5.1 Reporting outcomes and advising personnel	
5.2 Preparing and filling reports and 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. Select sample

- Sample of material or product is selected.
- Acceptance criteria for testing of sample is determined and confirmed.

LO3. Organise test results

- Testing requirements are confirmed.
- Tests are organised to ensure compliance with requirements.

LO4. Interpret test results

- Test results are collected and analysed.
- Outcomes are interpreted against process or product requirements.
- Acceptance criteria are reviewed as required.
- Action is taken, where required, in response to test results.

LO5. Report on analysed test results

- Outcomes are reported and appropriate personnel advised.
- Reports and documentation are prepared and filed.

Annex: Resource Requirements

IND TPT3 M07 0222: Organizing and interpret tests				
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	2pack	2:25
3.	Textile products	Any fibers, knitted, non-woven or woven fabrics	75m	5:1
D.	Tools and Equipment			
1.	Computer	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ Compatible Operating System: Android and Windows operating systems ▪ Native Resolution: 1920x1080 ▪ Resolution: 1080p ▪ Display Technology: LED 	1	1:25

		<ul style="list-style-type: none"> ▪ 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 		
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Acknowledgements

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The trainers who developed the curriculum

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