



# National Competency Standards Level-3 for Environmental Technology "Assistant Environmental Technician"



National Vocational and Technical Training Commission (NAVTTC),

Government of Pakistan





#### **ACKNOWLEDGEMENTS**

National Vocational and Technical Training Commission (NAVTTC) extends its gratitude and appreciation to representatives of business, industry, academia, government agencies, provincial TEVTAs, sector skill councils and trade associations who spared time and extended their expertise for the development of National Vocational Qualification for the trade of *Level-3 for Environmental Technology "Assistant Environmental Technician"*. This work would not have been possible without the technical support of the above personnel.

NAVTTC imitated development of CBT&A based qualifications for 200 traditional / hi-tech trades under the Prime **Minister's Hunarmand Pakistan Program**, focusing on Development & Standardization of 200 Technical & Vocational Education & Training (TVET) Qualifications. NAVTTC efforts have received full support from the Ministry of Federal Education and Professional Training which highly facilitated progress under this initiative.

It may not be out of place to mention here that all the experts of Industry, Academia and TVET experts of TEVTAs, BTEs and PVTC work diligently for making this qualification worthy and error free for which all credit goes to them. However, NAVTTC accepts the responsibility of all the errors and omissions still prevailing in the Qualification document.

It is also noteworthy that development of Skill Standards is a dynamic and ongoing process, and the developed skill standards needs periodic review and updating owing to the constant technological advancements, development in scientific knowledge, and growing experience of implementation at the grass root level as well as the demand of industry. NAVTTC will ensure to keep the qualifications abreast with the changing demands of both national and international job markets.

Sajid Baloch Executive Director (NAVTTC)





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### 1. Introduction

Climate change is already happening in the world today, and largely caused by human emissions of greenhouse gases. Changes to the earth's climate have included: warming of the atmosphere and oceans, reduced snow and ice, a rise in the level of the oceans, and changes in rainfall patterns and climate extremes. According to the latest research from the Intergovernmental Panel on Climate Change (IPCC), we have less than 11 years to make the transformation necessary to avoid the worst impacts of climate change. The level of carbon dioxide in the atmosphere would have to be cut by 45 per cent by 2030 to prevent global warming above 1.5°C – in other words, the threshold at which the worst impacts of climate change could be averted.

This Environmental Technology program will provide you with theoretical and practical knowledge to protect, conserve and preserve the environment with a career as an environmental technologist. The program will give you the skills and knowledge you need to work in the laboratory or field as an Environmental Technologist. You will work for the protection, conservation and preservation of our natural environment. The course applies the chemical, physical and biological sciences to environmental issues, and relates these issues to various possible career paths.

The Assistant Environmental Technician duties include collection of different samples, assisting in laboratory and field operations, performing minor maintenance of equipment and maintaining routine records.

Being conscious of the emerging trends in the market, National Vocational & Technical Training Commission (NAVTTC) has developed competency standards in consultation with the stakeholders including academia, researchers, industry, chambers and TEVTAs for Level 3 Environmental Technology "Assistant Environmental Technician" under National Vocational Qualifications Framework (NVQF). The competency standard document has been designed to help trainees develop professional skills and facilitate them in targeting job market on national and international level especially Middle East.





## 2. Purpose of the Qualification

The purpose of this qualification is to set the highly professional standards for "Assistant Environmental Technician" in order to compete local and international job market. The specific objectives of developing these qualifications are as under:

- Empower the youth with globally required employable skills
- Cater the immediate need of skilled workers in GCC countries
- Produce competitive Assistant Environmental Technician
- Improve the quality and effectiveness of the training and assessment for Assistant
   Environmental Technician

#### 3. Date of Validation

The National Competency Standards Level-3 for Environmental Technology "Assistant Environmental Technician" has been validated by the Qualifications Validation Committee (QVC) members on 29<sup>th</sup> April, 2022 and will remain valid for ten years i.e. 28<sup>th</sup> April, 2032.

### 4. Date of Review

The National Competency Standards Level-3 for Environmental Technology "Assistant Environmental Technician" has been validated by the Qualifications Validation Committee (QVC) members on 29<sup>th</sup> April, 2022 and shall be reviewed after three years 29<sup>th</sup> April, 2025

#### 5. Codes of Qualifications

The International Standard Classification of Education (ISCED) is a framework for assembling, compiling and analyzing cross-nationally comparable statistics on education and training. ISCED codes for these qualifications are assigned as follows:





ISCED Classification				
Code	Description			
0712-EPT (2)	National Competency Standards Level-2 for Environmental Technology			
	"Environmental Services Attendant"			
0712-EPT (3)	National Competency Standards Level-3 for Environmental Technology			
	"Assistant Environmental Technician"			
0712-EPT (4)	National Competency Standards Level-4 for Environmental Technology			
	"Environmental Technician""			
0712-EPT (5)	National Competency Standards Level-5 for Environmental Technology			
	"Environmental Supervisor"			





# 6. Members of Qualification Development Committee

The following members participated in the qualification development process at PITAC, Lahore.

Date: 14-03-2022 to 18-03-2022

S#	Name	Designation	Organization
1.	Mr. Muhammad Aasim	Assistant Director Coordinator	NAVTTC
2.	Mr. Aijaz Ahmed Zia	Data Annotation Specialist/ DACUM Facilitator	Pointivo (USA)
3.	Mr. Abdul Qayum Memon	Assistant Director  Nomination from STEVTA	STEVTA
4.	Prof. Dr. Muhammad Hassan Mushtaq	Professor	EPPH, UVAS Lahore
5.	Dr. Furqan Awan	Lecturer	EPPH, UVAS Lahore
6.	Mr. Qais Raza	MSc Energy & Environmental Engineering Research Assistants	University of the Punjab
7.	Mr. Adeel Khan	Energy & Environmental Engineer Nomination from STEVTA	GPI Sachal, Karachi
8.	Mr. Naeem Ahmad	Quality Assurance Trainer and Auditor	Pak TIC Service Pvt. Ltd. Lahore
9.	Dr. Farzana Rashid	Professor	Lahore College for Women University (LCWU), Lahore





10.	Ms. Sheeba Bibi	CBT&A Expert	Bahria University,
			Islamabad
11.	Syed Abdulrehman	MSc Energy & Environmental	University of the Punjab
	Jaffery	Engineering Research	
		Assistants	
12.	Mr. Abid Shah	PhD Environmental Sciences	Philip Morris Mardan
		&Engineering Agronomist	Pakistan Ltd
13.	Mr. Hassaan Bin	Lecturer, Environmental	University of the Punjab
	Saadat	Sciences	

# 7. Qualification Validation Committee

The following members participated in the qualification development process at PITAC, Lahore.

Date: 25-04-2022 to 29-04-2022

S#	Name	Status in Committee	Organization
1.	Mr. Muhammad Aasim	Assistant Director	NAVTTC
		Coordinator	
2.	Mr. Aijaz Ahmed Zia	Data Annotation Specialist/	Pointivo (USA)
		DACUM Facilitator	
3.	Ms. Sumbal Ayaz	Co-DACUM Facilitator	Abacus Consultation
4.	Engr. Kifayatullah	HOD	GPI Khanozia
		Representative B-TEVTA	
5.	Mr. Mushtaq Ahmed	Director M&E	P-TEVTA





6.	Engr. Rizwan Ahmed	Assistant Director (AA&R)	P-TEVTA
7.	Prof. Dr. Muhammad	Professor	EPPH, UVAS Lahore
	Hassan Mushtaq		
8.	Mr. Adeel Khan	Energy &Environmental	Nomination from STEVTA
		Engineering	
9.	Mr. Naeem Ahmad	Quality Assurance Trainer	Pak TIC Service Pvt. Ltd.
		and Auditor	Lahore
10.	Dr. Farzana Rashid	Professor	Lahore College for Women
			University (LCWU), Lahore
11.	Syed Abdulrehman	MSc Energy &	University of the Punjab
	Jaffery	Environmental Engineering	
		Research Assistants	
12.	Mr. Shaukat Ali Rana	Deputy Controller	PBTE
13.	Mr. Hassaan Bin Saadat	Lecturer, Environmental Sciences	University of the Punjab

# 8. Entry Requirements

The entry requirement for National Competency Standards Level-3 for Environmental Technology "Assistant Environmental Technician "is:

 A person having Level 2 Environmental Technology Certificate of Environmental Services Attendant

# 9. Regulation of the Qualification and Schedule of Units

Not Applicable

# 10. Generic Modules with Respective Levels





- Health and Safety
- Digital Skills
- Soft Skills

LEVEL 2

LEVEL 3

LEVEL 4





# 11. Summary of competencies

Sr. No.	Competency Standards	NVQF Category Level	Estin	Estimated Contact Hours			
				Th.	Pr.	Total	
1.	Observe Workplace Ethics-I	3	Generic	10	30	40	4
2.	Use Basic IT Skills	3	Generic	14	66	80	8
3.	Exercise/Apply Basic Concepts of Environmental Technology	3	Technical	24	36	60	6
4	Collect/Prepare Samples for Analysis	3	Technical	21	99	120	12
5	Assist in Laboratory and Field Operations	3	Technical	14	96	110	11
6	Assist in Maintenance of Equipment	3	Technical	20	90	110	11
7	Maintain Routine Record	3	Technical	17	63	80	8
				120	480	600	60





Total				
		20	80	
Percentage (%)				

**Prosed Course Duration:** 6 Months **Estimated Contact Hours:** 600 Hours

Estimated Credit Hours: 60 Hours





# OCCUPATIONS AND LEVELS DESCRIPTOR

Level 2	Level 3	Level 4	Level 5

S#	Occupations	No of Modules/CS	Level	Occupation Credit Hours	Training Duration
1.	Environmental Services Attendant	7	2	60	6 Months
2.	Assistant Environmental Technician	7	3	60	6 Months
3.	Environmental Technician	12	4	120	12 Months
4.	Environmental Supervisor	9	5	120	12 Months





# 12. Qualification Levelling and Packaging

#### Level 3

## (Assistant Environmental Technician)

- 1. Observe Workplace Ethics-I
- 2. Perform Basic Computer Operations
- **3.** Exercise/Apply Basic Concepts of Environmental Technology
- 4. Collect/Prepare Samples for Analysis
- 5. Assist in Laboratory and Field Operations
- **6.** Assist in Maintenance of Equipment
- 7. Maintain Routine Record





# 13. Detail of Qualifications and its Competency Standards

## A. <u>Technical Competency Standards</u>

# 0712-EPT-1: Apply Basic Concepts of Environmental Technology

#### Overview

This competency standard will provide knowledge and skills required to implement organizational goals and policies relevant to environmental technology. This will also familiarize the trainee with energy concepts and sources of energy.

Competency Units	Performance Criteria		
CU1. Identify various forms of	Trainee must be able to:		
energy	P1. Interpret concepts of different forms of energy such		
	as		
	Kinetic Energy (electrical, radiant and thermal		
	etc.)		
	Potential energy (mechanical, nuclear,		
	chemical and gravitational etc.)		
	P2. Perform inter-conversion of energy		
CU2. Identify different sources of	P1.Interpret the concepts of renewable energy sources		
energy	such as solar, biomass, hydropower, wind and		
	geothermal, tidal etc.		
	P2. Interpret the concepts of non-renewable energy		
	sources such as coal, natural gas, nuclear and fossil		
	fuels		

## **Knowledge & Understanding**

Trainee must be able to know and understand:





- Define the term 'Energy'
- Describe the forms of Energy and their inter-conversion
- Describe the various sources of energy
- Explain the basic National Environmental Quality Standards (NEQS)
- Enlist various forms and sources of energy
- Enlist various Environmental Standards

#### **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items
1.	Computer system
2.	Microsoft Office
3.	Multimedia
4.	Manual of Applicable Environmental Standards
5.	Wind energy demonstration model

### Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Draw the energy conversion diagram.
- Perform the energy generation using wind energy model.

# 0712-EPT-2: Collect/Prepare Samples for Analysis

#### Overview

This competency standard will provide knowledge and skills required to identify, collect and prepare samples for further analysis. Sample collection techniques and risk related to various samples will also be the part of this competency standard.





Competency Units	Performance Criteria
CU1. Identify samples to be	Trainee must be able to:
collected	P1. Identify sources of sample such as air, water and soil
	P2. Identify area of sample source
	P3. Identify the purpose of sample to be analyzed
	P4. Identify and inspect possible hazard and risks related
	to sample source
CU2. Collect samples	P1. Use PPEs before collecting samples
	P2. Select appropriate tools and equipment for sample
	collection
	P3. Collect the required samples as per standards
	P4. Perform labelling of collected samples as per set
	standards
	P5. Transport the stored samples as per SOP's
CU3. Prepare samples	P1. Check the SOPs requirement for sample analysis
	P2. Process the collected sample to required form, if
	necessary for analysis
	P3. Label the collected sample as per set standards

# **Knowledge & Understanding**

### Trainee must be able to know and understand:

- Define the term 'Hazard'
- Define the term 'Sample'
- Explain the SOPs for sample collection
- Explain the SOPs for sample preparation
- Enlist different materials and equipment necessary for laboratory operations
- Enlist different PPEs and their uses
- Explain procedures for handling different types of samples.





# **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items
1.	Computer system
2.	Microsoft Office
3.	Multimedia
4.	Laboratory equipment
5.	PPEs
6.	Sample collection checklist
7.	First aid kit
8.	Chemical spillage kit

# Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

> Collect sample of a provided site.





# 0712-EPT-3: Assist in Laboratory and Field Operations

### Overview

This competency standard will provide knowledge and skills required to assist laboratory and field operations as per organizational requirements. It will also equip the trainee with initial preparation for data collection and good laboratory practices.

Competency Units	Performance Criteria
CU1. Arrange the Tools and	Trainee must be able to:
Materials	P1. Identify the available materials and equipment
	<b>P2.</b> Check the specific requirement of survey site or procedure
	P3. Inspect the available materials and equipment before use
	P4. Identify SOPs/manual to use materials and equipment
	P5. Arrange tools/equipment as per job requirement
CU2. Prepare Reagents for	P1. Use PPEs as per standard recommendations
analysis	P2. Follow Standard Operating Procedures (SOPs) for
	preparation of required reagents
	P3. Inspect the prepared reagents and equipment before
	use
	P4. Label and store the prepared reagents
CU3. Collect data for report	P1. Identify the suitable site for data collection
	P2. Choose the appropriate data
	P3. Take physical evidences of data
	P4. Mark the collected data
	P5. Forward the saved data to the concerned





## **Knowledge & Understanding**

#### Trainee must be able to know and understand:

- Define the term 'Data'
- Describe the initial steps for reagent preparation
- Define 'SOPs'
- Explain the SOPs being used in field operations
- Enlist different materials and equipment necessary for laboratory operations

## **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items
1.	Computer system
2.	Microsoft Office
3.	Multimedia
4.	Laboratory equipment
5.	PPEs
6.	Survey checklist
7.	First aid kit
8.	Fire extinguishers
9.	Chemical spillage kit
10.	Fume hood

## Critical Evidence(s) Required

The candidate needs to develop the following critical evidence(s) in order to be competent in this competency standard

- Use different type of PPEs.
- Prepare the reagents with provided materials.





# 0712-EPT-4: Assist in Maintenance of Equipment

### Overview

This competency standard will provide knowledge and skills required to identify and maintain the faulty equipment.

Competency Units		Performance Criteria
CU1.	Identify faults	Trainee must be able to:
		P1. Identify the faulty equipment
		P2. Use PPEs as per standard recommendation
		P3. Label the out of order equipment
		P4. Report the faulty equipment to concerned authority
CU2.	Perform routine	P1. Identify the required resources for routine
	maintenance of equipment	maintenance
		P2. Check the calibration status of equipment
		P3. Perform maintenance of equipment as required
		P4. Verify the proper working of equipment
		P5. Maintain Log book
CU3.	Collect data for	P1. Use the checklist for routine maintenance
	maintenance report	P2. Collect evidence(s) of required maintenance of the
		equipment
		P3. Verify the collected evidence(s) of maintenance

# **Knowledge & Understanding**

### Trainee must be able to know and understand:

- Define the term 'Fault' and 'Maintenance'
- Describe the types of faults and maintenance
- Explain the types of tools required for maintenance
- Enlist different tools and their uses





# **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items
1.	Computer system
2.	Microsoft Office
3.	Internet
4.	PPEs
5.	Toolbox
6.	First aid kit
7.	Lubricant spillage kit

## Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Use tools for maintenance
- > Perform maintenance of faulty machine/equipment





### 0712-EPT-5: Maintain Routine Record

### Overview

This competency standard will provide knowledge and skills required to manage concerned department inventory and record of routine operations.

Competency Units	Performance Criteria
CU1. Maintain record of	Trainee must be able to:
inventory	P1. Understand Standard Operating Procedures (SOPs)
	for inventory management
	P2. Identify concerned list of inventory
	P3. Inspect 'In' and 'Out' of the material from the store
	P4. Record details of the material issued or received
	P5. Coordinate with other relevant departments for
	material demand and issuance
	P6. Follow basic inventory management concepts like
	First In First Out (FIFO), First Expire First Out
	(FEFO), Last In First Out (LIFO) etc.
CU2. Maintain record of	P1. Identify relevant types and frequency of records
operations and	P2. Inspect routine operations for record keeping
maintenance	P3. Check routine and planned maintenance for record
	keeping
	P4. Store collected records according to Standard
	Operating Procedure (SOP)
	P5. Identify the retention process and time of record
	(document)

# **Knowledge & Understanding**

Trainee must be able to know and understand:





- Define the term 'Inventory'
- Describe the types of Inventory and its categories
- Define FIFO, FEFO, LIFO
- Explain the different concepts of inventory management
- Enlist possible various materials and items in an organizational inventory
- Explain procedure for maintaining records of operations, maintenance and inventory

## **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items
1.	Computer system
2.	Microsoft Office
3.	Internet
4.	Inventory maintenance checklist
5.	Record maintenance register (Notebook)

### Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Use Microsoft Excel sheet for inventory data input
- Perform records of maintenance of a given machine





### B. Generic Competency Standards

### 1022-OHS-1: Observe Workplace Ethics-I

#### Overview

This competency standard will provide knowledge and skills related to workplace ethics. This will help to build trainees character, required to meet the standard core values of any organization.

Competency Units	Performance Criteria
CU1. Ensure discipline at	Trainee must be able to:
workplace	P1. Follow work ethics as per company policy
	P2. Follow SOPs for working on site
	P3. Ensure punctuality and dedication
	P4. Treat everyone with respect
CU2. Promote culture of integrity	P1. Identify core values of human relationship in an
at workplace	organization
	P2. Practice integrity for understanding positive culture
	P3. Practice self-accountability

## **Knowledge & Understanding**

#### Trainee must be able to know and understand:

- Define work ethics
- Define integrity
- Describe at least two traits of work ethics

### **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items
1.	Computer system
2.	Internet





3. Connecting apps (MS Teams/Google hangout/Zoom/Slack/WhatsApp group)

# Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- > Make charts for core values of the organization.
- Perform activity on work ethics and integrity.





# **0611-CU-1: Perform Basic Computer Operations**

**Overview:** This competency standard will provide skills and knowledge related to basic computer hardware, software, applications and troubleshooting. You will be able to demonstrate your skills in operating a computer system and software such as MS Word, MS PowerPoint, MS Excel as well as installation and troubleshooting of operating system and software. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Configure	You must be able to:
Computer System	P1. Connect computer components and peripherals as per
	requirement.
	P2. Install Drivers and applications according to the software
	specification.
	P3. Troubleshoot Applications to trace and fix faults in a
	specific application to bring it in a running condition.
CU2. Create a Document	You must be able to:
using MS Word	P1. Compose a document as per the requirement.
	P2. Format Word Document according to given
	requirements.
	P3. Print Word Documents according to requirements.
CU3. Preparer a	You must be able to:
Worksheet using MS	P1. Develop a worksheet as per given data.
Excel	P2. Format the worksheet according to given criteria.
	<b>P3.</b> Apply Formulas according to the requirement.
	P4. Generate Charts/Graphs according to the given data.
CU4. Prepare a	You must be able to:
presentation using MS	P1.Insert Slides with different Layouts according to
PowerPoint	requirements of presentation.





P2. Insert text, tables, images, etc. according to the
requirement.
P3. Apply a set of effects to animate the slide according to
requirement.
P4. Apply Slide Transitions on Slides according to
requirement.
<b>P5.</b> Apply Sound Effects on Objects/text/images according to
requirement.
P6. Present a presentation according to 7Cs of
communication.

# **Knowledge & Understanding**

#### Trainee must be able to know and understand:

- **K1.** Operating systems
- **K2.** Hardware and Software
- **K3.** Troubleshooting
- **K4.** Internet and E-mailing
- K5. Hyperlink and referencing
- **K6.** Printing
- **K7.** Formulas
- **K8.** Short Keys
- **K9.** WPM (Word Per Minute)
- K10. 7 Cs of communication

# **Tools and Equipment Required**

The tools and equipment required for this competency standard are given below:

Sr. No.	Items	





1.	Computer system
2.	Microsoft Office
3.	Multimedia
4.	Internet
5.	Internet browser
6.	Peripheral devices

## Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- > Install MS Office Application correctly
- Prepare a formatted document using MS Word
- > Enter data into the respective columns and rows as per given instructions
- Set page layouts and margins
- > Apply any slide transition on entire presentation.