# Curriculum

# For

# "Environmental Technology"

**(Environmental Technician)**

**(Level -4)**

***07th to 11thNovember 2022***

**National Vocational & Technical Training Commission**

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# Introduction

## Definition/Description of the training programme for *Environmental Technology*

Environmental technology refers to the field of science concerned with reducing the human impact on the environment through technological advances or improvements. Some common applications of environmental technology deal with reducing energy consumption, limiting man-made damage to the physical environment, and reducing waste. Areas of research in the field may involve cleaner energy sources, improved energy efficiency in transportation and buildings, and methods that decrease or prevent pollution. This is a broad field that draws on many sciences, some of which include chemistry, ecology, and biology. Innovation and advances in environmental science may have commercial applications, save money, or be designed to meet government regulations.

One focus of environmental technology is on finding, using, and developing clean sources of energy that have a limited impact on the natural environment. The use of fossil fuels in electricity production transportation is not only responsible for releasing particulate matter known as smog, but also for emitting carbon dioxide. According to the United States government and others, carbon dioxide is a greenhouse gas and pollutant with the potential to harm human health through climate change. So-called alternative energy sources could reduce pollution, including air pollutants like carbon dioxide.

Basic economic factors are often a spur to advances in environmental technology. This is due in part to the fact that cost-saving solutions are usually the most efficient. Cost increases of fuels such as gasoline, for instance, have led to technology aimed at reducing fuel consumption. Advances in automobile fuel efficiency lower fuel costs while reducing harmful emissions. Many countries have vehicle efficiency regulations that were originally developed to conserve energy and keep fuel prices low but also help combat pollution problems like smog.

The main purpose of this course is to enable the student to play his/her vital role in Environmental Technology through modern knowledge driven approach.

In short, the main objective of this project is to equip the students with knowledge and skills so that they could be able to handle the issues related with rational use of inputs, minimize the economic cost and can help to enhance competencies to promote Environmental

Technology. The effort of new curriculum development by NAVTTC will help the Environmental of Pakistan to hire trained and skilled experts that will contribute in the improvement of Environmental Technology.

A first-hand experience of technological approaches to impact management, through field site visits where particular technologies are in use, is a feature of the course. Aspects of the economic and legislative issues related to the management of the environment and the use of technologies will also be covered in this course.

## Purpose of the Training Programme

The purpose of this qualification (set of four occupations) is to set professional standards for Environmental Technology and to train the unskilled workers (men and women) across the country. The skilled labors will serve as key elements to improve the Environment using Technologies. Upon successful completion of this course the trainees should be able to know the basic and specific objectives of these qualifications are as under:

- Improve the professional competence regarding Environmental Technology
- Capacitate the local community and trainers in modern Competency Based Training (CBT)
- Provide flexible pathways and progressions in Environmental Technology
- Enable the trainees to perform their duties in efficient manner
- Establish a standardised and sustainable system of training on Environmental Technology in Pakistan
- Understand the issues related to Environment
- Know the relevant industry stakeholders & their role

## Overall Objectives of Training Programme

The primary objective of this training program is to provide the trainees with updated knowledge and skills required for Environmental Technology to cope the challenges of the field. After qualifying the course at different levels (Level 1 – 5), the students will be able to get job in the relevant sector and also be able to perform as entrepreneurs. The contents of the course are specifically designed in such a way that it covers all the major Environmental Technology aspects hence, the students are sufficiently exposed to operational requirements of this sector and are ready to perform their duties confidently.

The main objectives of this project are to:

- Improve the quality of training delivery and setting national benchmarks for training of Environmental technology (Level 1-5) at national level.
- Provide progressive and flexible learning environment for trainees.
- Provide basics for competency-based assessment.
- Establish a standardized and sustainable training system.

### Competencies to Be Gained After Completion Of Course

- **A-** Apply Occupational Health, Safety and Environmental (OHS&E) Regulations
- **B-** Observe Work Place Ethics-II
- **C-** Participate in field inspection and investigation
- **D-** Analyze various Environmental Samples
- **E-** Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples
- **F-** Operate various Equipment related to Environmental Technology
- **G-** Inspect and maintain equipment
- **H-** Generate Operational and Maintenance Report
- **I-** Manage Waste at Site
- **J-** Act as a liaison between Operational Staff and Management
- **K-** Assist the Supervisor in Cost Analysis related to Operations and Maintenance
- **L-** Assist in Regulatory Compliance and other Duties

### Possible Available Job Opportunities Available Immediately and Later In The Future

- Environmental Technician
- Technician
- Environmental Lab Technician
- Maintenance Technician
- Warehouse Technician
- Environmental Inspector

## Trainee Entry Level

For National Vocational Certificate Level-3 in Environmental Technology, the entry requirement is Matriculation or equivalent to Matriculation.

## Minimum Qualification of Trainer

Teaching staff should have DAE with two years' experience or 2 years Certificate with two years' experience in relevant field. They should also hold or be working towards a formal teaching qualification.

Other formal qualifications in the relevant field of Environmental Technology would be useful in addition to the above.

## Recommended Trainer: Trainee Ratio

The recommended maximum trainer: trainee ratio for this programme is 1 trainer for 25 trainees.

## Medium of Instruction i.e. Language of Instruction

Instruction will be Urdu, English or Regional Language.

## Duration of the Course (Total Time, Theory & Practical Time)

This curriculum comprises 09 modules. The recommended delivery time is 600 hours. Delivery of the course could therefore be full time, 5 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

| Module | Theory Days/hours | Workplace Days/hours | Total hours |
|---|---|---|---|
| **Module 1:** Apply Occupational Health, Safety and Environmental (OHS&E) Regulations | | | |
| **Module 2:** Observe Work Place Ethics-II | | | |
| **Module 3:** Participate in field inspection and investigation | | | |
| **Module 4:** Analyze various Environmental Samples | | | |
| **Module 5:** Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples | | | |
| **Module 6:** Operate various Equipment related to Environmental Technology | | | |
| **Module 7:** Inspect and maintain equipment | | | |
| **Module 8:** Generate Operational and Maintenance Report | | | |
| **Module 9:** Manage Waste at Site | | | |
| **Module 10:** Act as a liaison between Operational Staff and Management | | | |
| **Module 11:** Assist the Supervisor in Cost Analysis related to Operations and Maintenance | | | |
| **Module 12:** Assist in Regulatory Compliance and other Duties | | | |

## Summary of Competency Standards

The proposed curriculum is composed of 23 cores along with generic modules that will be covered in 3600 hrs. It is proposed that the course will be delivered in three years period (Level 1-5). The distribution of contact hours (practical & theory) is given below:

- **Theory:** (20%) **Practical** (80%)
- **Theory:** 240 **hours** **Practical:** 960 **hours**

## Sequence of the Modules

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardised approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the industrial needs of Pakistan.
The distribution table is shown below:

<table>
<tr><th colspan="3">Environmental Technician - 12 Months</th></tr>
<tr><td colspan="2">Module 2: Observe Workplace Ethics-II<br>80 Hours</td><td rowspan="3">Module 3: Participate in field inspection and investigation<br>150 Hours</td></tr>
<tr><td colspan="2">Module 4: Analyse various Environmental Samples<br>150 Hours</td></tr>
<tr><td>Module 5: Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples<br>140 Hours</td><td>Module 6: Operate various Equipment related to Environmental Technology<br>120 Hours4</td></tr>
<tr><td>Module 8: Generate Operational and Maintenance Report<br>80 Hours</td><td>Module 9: Manage Waste at Site<br>90 Hours</td><td>Module 10: Act as a liaison between Operational Staff and Management<br>60 Hours</td></tr>
<tr><td colspan="2">Module 11: Assist the Supervisor in Cost Analysis related to Operations and Maintenance<br>70 Hours</td><td>Module 12: Assist in Regulatory Compliance and other Duties<br>50 Hours</td></tr>
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|---|
| **Module 1:** Apply Occupational Health, Safety and Environmental (OHS&E) Regulations<br>**110 Hours** |
| **Module 7:** Inspect and maintain equipment<br>**80 Hours** |

## Summary – Overview of the Curriculum

| Module Title and Aim | Learning Units | Theory Days/hours | Workplace Days/hours | Timeframe of modules |
|---|---|---|---|---|
| **Module 1:** Apply Occupational Health, Safety and Environmental (OHS&E) Regulations<br><br>**Aim:** After successful completion of this module, the trainee is competent in Applying Occupational Health, Safety and Environmental (OHS&E) Regulations | **LU1:** Perform safety inspection<br>**LU2:** Take corrective measures<br>**LU3:** Assist in implementation of safety regulation<br>**LU4:** Assist in Implementation of Environmental Regulation | 20 | 90 | 110 |
| **Module 2:** Observe Work Place Ethics-II<br><br>**Aim:** After successful completion of this module, the trainee is competent in Observing Work Place Ethics-II | **LU1:** Demonstrate integrity at workplace<br>**LU2:** Put away things that distract from work (Discipline)<br>**LU3:** Spend your time wisely on tasks that align with organizational goals<br>**LU4:** Practice time management<br>**LU5:** Possess honesty<br>**LU6:** Be flexible | 20 | 60 | 80 |

| Module Title and Aim | Learning Units | Theory Days/hours | Workplace Days/hours | Timeframe of modules |
|---|---|---|---|---|
| **Module 3:** Perform field inspection and investigation<br><br>**Aim:** After successful completion of this module, the trainee is competent in Performing field inspection and investigation | **LU1:** Prepare for inspection<br>**LU2:** Perform field survey<br>**LU3:** Draft Survey report | 20 | 130 | 150 |
| **Module 4:** Analyse various Environmental Samples<br><br>**Aim:** After successful completion of this module, the trainee is competent in Analysing various Environmental Samples | **LU1:** Perform sample tracking<br>**LU2:** Perform tests on various samples<br>**LU3:** Record the results<br>**LU4:** Prepare the analysis report | 20 | 130 | 150 |

| Module Title and Aim | Learning Units | Theory Days/hours | Workplace Days/hours | Timeframe of modules |
|---|---|---|---|---|
| **Module 5:** Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples<br><br>**Aim:** After successful completion of this module, the trainee is competent in Performing Physical, Chemical and Biological Tests on Air, Water and Soil Samples | **LU1:** Perform physical tests<br>**LU2:** Perform chemical tests<br>**LU3:** Perform biological tests | 20 | 120 | 140 |
| **Module 6:** Operate various Equipment related to Environmental Technology<br><br>**Aim:** After successful completion of this module, the trainee is competent in Operating various Equipment related to Environmental Technology | **LU1:** Select equipment for Physical, Chemical and Biological analysis<br>**LU2:** Check operations of equipment<br>**LU3:** Operate equipment safely | 20 | 120 | 140 |

| Module Title and Aim | Learning Units | Theory Days/hours | Workplace Days/hours | Timeframe of modules |
|---|---|---|---|---|
| **Module 7:** Inspect and maintain equipment<br><br>**Aim:** After successful completion of this module, the trainee is competent in Inspecting and maintain equipment | **LU1:** Conduct Inspection of equipment<br>**LU2:** Check calibration of equipment<br>**LU3:** Rectify the faults and damages (if any)<br>**LU4:** Ensure preventive and corrective maintenance | 20 | 60 | 80 |
| **Module 8:** Generate Operational and Maintenance Report<br><br>**Aim:** After successful completion of this module, the trainee is competent in Generating Operational and Maintenance Report | **LU1:** Collect data for report<br>**LU2:** Generate operational report<br>**LU3:** Generate maintenance report | 20 | 60 | 80 |

| Module Title and Aim | Learning Units | Theory Days/hours | Workplace Days/hours | Timeframe of modules |
|---|---|---|---|---|
| **Module 9:** Manage Waste at Site<br><br>**Aim:** After successful completion of this module, the trainee is competent in Managing Waste at Site | **LU1:** Identify sources for data collection<br>**LU2:** Follow SOPs for data collection<br>**LU3:** Plan an approach and methods<br>**LU4:** Collect data | 30 | 60 | 90 |
| **Module 10:** Act as a liaison between Operational Staff and Management<br><br>**Aim:** After successful completion of this module, the trainee is competent in Acting as a liaison between Operational Staff and Management | **LU1:** Classify different categories of waste<br>**LU2:** Apply waste management techniques | 20 | 40 | 60 |

| Module Title and Aim | Learning Units | Theory Days/hours | Workplace Days/hours | Timeframe of modules |
|---|---|---|---|---|
| **Module 11:** Assist the Supervisor in Cost Analysis related to Operations and Maintenance<br><br>**Aim:** After successful completion of this module, the trainee is competent in Assist the Supervisor in Analysing related to Operations and Maintenance | **LU1:** Keep the record of operational costs<br>**LU2:** Keep the record of maintenance cost<br>**LU3:** Forward the cost analysis data to the Supervisor | 20 | 50 | 70 |
| **Module 12:** Assist in Regulatory Compliance and other Duties<br><br>**Aim:** After successful completion of this module, the trainee is competent in Assisting in Regulatory Compliance and other Duties | **LU1:** Follow applicable regulations<br>**LU2:** Document compliance processes<br>**LU3:** Maintain the record | 10 | 40 | 50 |

## Modules

### Module 1: Apply Occupational Health, Safety and Environmental (OHS&E) Regulations

**Objective of the module:** This unit describes the skills and knowledge required to Apply Occupational Health, Safety and Environmental (OHS&E) Regulations. This will help to build trainees character, required to meet the standard core values of any organisation.

**Duration:** 110 hours **Theory:** 20 hours **Practical:** 90 hours

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1:** Perform safety inspection | **The trainee will be able to:**<br>**1.** Follow organization health & safety policy & procedures<br>**2.** Use PPEs before starting any task<br>**3.** Conduct site survey<br>**4.** Identify different hazards at site<br>**5.** Ensure operational SOPs are being followed<br>**6.** Fill Job hazard analysis sheet | • Define the term “health and safety”<br>• Health and safety hazards in field<br>• Safety inspection and investigation<br>• Job hazard analysis | **Total:** 05hrs<br>**Theory:** 10hrs<br>**Practical:** 45hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class room/Lab/Simulated Environment |
| **LU2:** Take corrective measures | **The trainee will be able to:**<br>**1.** Suggest the required control measures | • Control measures vs. Corrective measures | **Total:** 05hrs<br>**Theory:** 10hrs<br>**Practical:** 45hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers | Class room/Lab/Simulated Environment |

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|---|---|---|---|---|---|
| | **2.** Implement corrective measures | • Importance of Control measures | | • Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | |

## Module 2: Observe Work Place Ethics-II

**Objective of the module:** After successful completion of this module, the trainee is competent in performing Observe Work Place Ethics-II.

**Duration:** 80 hours **Theory:** 20 hours **Practical:** 60 hours

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Demonstrate integrity at workplace | **The trainee will be able to:**<br>**1.** Refrain from sharing confidential information with others<br>**2.** Remain honest with colleagues<br>**3.** Avoid backbiting<br>**4.** Admit when you are wrong | • Work Ethics<br>• Workplace Policies | **Total:** 07hrs<br>**Theory:** 03hrs<br>**Practical:** 10hrs | Consumable<br>• Pocket files<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class room/Lab/Simulated Environment |
| **LU2.** Put away things that distract from work (Discipline) | **The trainee will be able to:**<br>**1.** Avoid using mobile phone at work place (if not necessary)<br>**2.** Focus on what you are doing<br>**3.** Take interest in your | • Work Ethics<br>• Workplace Policies | **Total:** 14hrs<br>**Theory:** 03hrs<br>**Practical:** 10hrs | Consumable<br>• Pocket files<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable | Class room/Lab/Simulated Environment |

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|---|---|---|---|---|---|
| | work | | | • White board<br>• Multimedia<br>• Internet<br>• Computer system | |
| **LU3.** Spend your time wisely on tasks that align with organizational goals | **The trainee will be able to:**<br>**1.** Be regular and punctual<br>**2.** Focus on your goals | • Work Ethics<br>• Workplace Policies | **Total:** 14hrs<br>**Theory:** 03hrs<br>**Practical:** 10hrs | Consumable<br>• Pocket files<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class room/Lab/Simulated Environment |
| **LU4.** Practice time management | **The trainee will be able to:**<br>**1.** Figure out how you are currently spending your time<br>**2.** Create a daily schedule and stick with it<br>**3.** Assign time limits to task | • Work Ethics<br>• Workplace Policies | **Total:** 15hrs<br>**Theory:** 03hrs<br>**Practical:** 10hrs | Consumable<br>• Pocket files<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board | Class room/Lab/Simulated Environment |

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|---|---|---|---|---|---|
| | **4.** Learn to say no<br>**5.** Prioritize wisely | | | • Multimedia<br>• Internet<br>• Computer system | |
| **LU5.** Possess honesty | **The trainee will be able to:**<br>**1.** Be truthful<br>**2.** Be straightforward<br>**3.** Stop comparing yourself to others<br>**4.** Be the best version of yourself<br>**5.** Do not exaggerate or embellish | • Work Ethics<br>• Workplace Policies | **Total:** 15hrs<br>**Theory:** 04hrs<br>**Practical:** 10hrs | Consumable<br>• Pocket files<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class room/Lab/Simulated Environment |
| **LU6.** Be flexible | **The trainee will be able to:**<br>**1.** Focus on core values<br>**2.** Be open-minded<br>**3.** Develop skill set<br>**4.** Be optimistic<br>**5.** Stay calm<br>**6.** Plan ahead<br>**7.** Have a strong support network | • Work Ethics<br>• Workplace Policies | **Total:** 15hrs<br>**Theory:** 04hrs<br>**Practical:** 12hrs | Consumable<br>• Pocket files<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia | Class room/Lab/Simulated Environment |

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| | | | | • Internet<br>• Computer system | |

## Module 3: Perform field inspection and investigation

**Objective of the module:** After completing this module, the learner will be able to perform field inspection and investigation.

**Duration:** 150 hrs. **Theory:** 20 hrs. **Practical:** 130 hrs.

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Prepare for inspection | **The trainee will be able to:**<br>**1.** Prepare for the field survey<br>**2.** Identify and count cases (present and past)<br>**3.** Consider previous incidental history | • Describe the term 'Field survey'<br>• Importance of Incident Investigation<br>**Practical Activity:**<br>**1.** Prepare a checklist for field survey<br>**2.** Prepare a report on previous incidental histories | **Total:** 26hrs<br>**Theory:** 08hrs<br>**Practical:** 18hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |
| **LU2.** Perform field survey | **The trainee will be able to:**<br>**1.** Identify research goals and objectives<br>**2.** Decide on the type of method<br>**3.** Identify hazards in the field | • SOP's to conduct field inspection<br>• Importance of communication with local respondents<br>• Method for Data and Sample Collection<br>• Types of Survey | **Total:** 26hrs<br>**Theory:** 08hrs<br>**Practical:** 18hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board | Class Room/ Site Specific Field Area |

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| | **4.** Conduct the survey and gather responses<br>**5.** Tabulate and orient the data in terms of time, place, and person | ○ Online Survey Method<br>○ Face-to-Face Surveys<br>○ Focus Groups<br>○ Panel Sampling<br>○ Kiosk Surveys<br>○ Questionnaires<br><br>**Practical Activity:**<br>**1.** Prepare a questionnaire regarding field survey. | | • Multimedia<br>• Internet<br>• Computer system<br>• Calculator | |
| **LU3.** Draft Survey report | **The trainee will be able to:**<br>**1.** Follow the standard format for Survey report<br>**2.** Provide suggestions for implementation and evaluation of control and prevention measures<br>**3.** Generate Survey report | • Method to draft a Field Inspection and Investigation report<br>• Control measures for different hazards<br>• Differentiate between Control Measures and Preventive Measures<br><br>**Practical Activity:**<br>**1.** Draft a survey report of given scenario | **Total:** 26hrs<br>**Theory:** 08hrs<br>**Practical:** 18hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |

## Module 4: Analyse various Environmental Samples

**Objective of the module:** After completing this module, the learner will be able to Collecting/Preparing Samples for Analysis which include comprehensive knowledge of Prepare for work, Prepare reagents and Collect data for operational report by using appropriate method.

**Duration:** 150 hrs. **Theory:** 120 hrs. **Practical:** 130 hrs.

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Perform sample tracking | **The trainee will be able to:**<br>**1.** Identify sample required<br>**2.** Collect sample in specific container<br>**3.** Label the samples<br>**4.** Preserve sample as prescribed condition | • Types of samples (Grab sampling, composite sampling, random sampling, Integrated sampling, etc.)<br>• Sample tracking<br>• Sample preservation methods<br>**Practical Activity:**<br>**1.** Preserve a pre-treated sample for analysis and label it. | **Total:** 35hrs<br>**Theory:** 5hrs<br>**Practical:** 30hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment for sampling<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |

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|---|---|---|---|---|---|
| **LU2.** Perform tests on various samples | **The trainee will be able to:**<br>**1.** Select equipment required for test<br>**2.** Prepare sample for analysis<br>**3.** Identify methods required for specific characterisation<br>**4.** Conduct desired analysis according to SOPs<br>**5.** Prepare stock solution of different concentrations<br>**6.** Prepare serial dilution | • Sample preparation techniques<br>• Methods for characterisation<br>• Methods of sample analysis<br>• Preparation methods of solutions for different concentrations (Percentage, Molar, normal, Parts Per Million, etc.)<br>**Practical Activity:**<br>**1.** Prepare a stock solution and make the serial dilution as per instructions<br>**2.** Perform test of given sample as per instructions | **Total:** 50hrs<br>**Theory:** 8hrs<br>**Practical:** 42hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment for sampling<br>• Acids and Bases<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |
| **LU3.** Record the results | **The trainee will be able to:**<br>**1.** Take readings of the analysis<br>**2.** Perform the analysis in replicate to evaluate the data<br>**3.** Take mean value of results | • Replicate Readings<br>• Mean value of readings<br>**Practical Activity:**<br>**1.** Take readings and mean value of the analysis as per instructions and interpret the results | **Total:** 50hrs<br>**Theory:** 8hrs<br>**Practical:** 42hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment for sampling<br>• Acids and Bases | Class Room/ Site Specific Field Area |

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|---|---|---|---|---|---|
| | | | | Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | |
| **LU4.** Prepare the analysis report | **The trainee will be able to:**<br>**1.** Collect data<br>**2.** Perform appropriate calculation as per Standard method<br>**3.** Interpret the result in appropriate method<br>**4.** Generate report<br>**5.** Ensure retention time of report | • Analysis Report preparation | **Total:** 25hrs<br>**Theory:** 4hrs<br>**Practical:** 21hrs | | Class Room/ Site Specific Field Area |

## Module 5: Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples

**Objective of the module:** After completing this module, the learner will be able to assisting in Perform Physical, Chemical and Biological Tests on Air,

**Duration:** 140 hrs. **Theory:** 20 hrs. **Practical:** 120 hrs.

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Perform physical tests | **The trainee will be able to:**<br><br>**1.** Select equipment required for the tests<br>**2.** Prepare reagents required to conduct experiments<br>**3.** Perform experiment to find water pH, turbidity, Total Dissolve Solids (TDS), Total Suspended Solids (TSS), density, etc.<br>**4.** Conduct experiment to find out soil color, texture, structure, particle size, bulk density and soil permeability | • Chemical, Physical and Biological Tests on Air, Water and Soil Samples<br>• Physical Water Quality Parameter (water pH, Dissolve Oxygen (DO), Turbidity, TDS, TSS, density, Electrical Conductivity (EC), etc.)<br>• Physical Soil Quality Parameter (soil color, texture, structure, particle size, bulk density and soil permeability)<br>• Physical Air Quality Parameter (Particulate Matters (PM), etc.)<br>o Sources of Particulate Matters (PM)<br>o Types of Particulate Matters (PM): (PM 2.5 and PM 10) | **Total:** 30hrs<br>**Theory:** 6hrs<br>**Practical:** 24hrs<br><br>**Total:** 54hrs<br>**Theory:** 9hrs<br>**Practical:** 45hrs<br><br>**Total:** 56hrs<br>**Theory:** 6hrs<br>**Practical:** 50hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment<br>• Glasswares<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs<br>• PH meter, EC meter, Air Sampler, etc.) | Class Room/ Site Specific Field Area |

| | | | | | |
|---|---|---|---|---|---|
| | **5.** Conduct experiment to measure the PM by using Air Sampler | **Practical Activity:**<br>**1.** Determine the Physical quality parameters of given water sample<br>**2.** Determine the Physical quality parameters of given Soil sample<br>**3.** Determine the PM of Air | | | |
| **LU2.** Perform chemical tests | **The trainee will be able to:**<br>**1.** Prepare chemical reagents required for test<br>**2.** Select the appropriate equipment<br>**3.** Perform test to measure Chemical Oxygen Demand (COD)<br>**4.** Perform tests to measure the concentration of different heavy metals in air/water/soil | • Chemical Water Quality Parameters (Chloride ($Cl^-$), Sulphate ($SO_4^{-2}$), COD, Heavy Metals, etc.)<br>• Chemical Soil Quality Parameters (Nitrogen, Potassium, Phosphorus, Sulphate ($SO_4^{-2}$), Heavy Metals, etc.)<br>• Air Quality Parameters (Poly-aromatic Hydrocarbons (PAHs), Gaseous pollutants: COx, SOx, NOx, etc.)<br>**Practical Activity:**<br>**1.** Determine the Chemical quality parameters of given water sample<br>**2.** Determine the Chemical quality parameters of given Soil sample | **Total:** 54hrs<br>**Theory:** 9hrs<br>**Practical:** 45hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment<br>• Glasswares<br>• Acids and Bases<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs<br>• Ambient Air Analyser, Conductivity Meter, Kjeldahl Apparatus, | Class Room/ Site Specific Field Area |

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| | | **1.** Determine the SOx and NOx of Air | | Spectrophotometer, etc.) | |
| **LU3.** Perform biological tests | The trainee will be able to:<br>**1.** Prepare reagents required to conduct experiments<br>**2.** Select required equipment<br>**3.** Conduct experiment to measure Biological Oxygen Demand (BOD)<br>**4.** Perform the experiment to check the microorganisms in air/water/soil | • Biological Water Quality Parameters (BOD, Coliform Test, etc.)<br>• Biological Soil Quality Parameters (Microbial Load, etc.)<br>• Biological Air Quality Parameters (Microbial Load, etc.)<br>**<u>Practical Activity:</u>**<br>**1.** Determine the Biological quality parameters of given water sample<br>**2.** Determine the Biological quality parameters of given Soil sample<br>**1.** Determine the Microbial Load of given Air sample | **Total:** 56hrs<br>**Theory:** 6hrs<br>**Practical:** 50hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment<br>• Glasswares<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs<br>• Colorimeters, Photometers, BOD Analyser, Incubator, Autoclave, etc.) | Class Room/ Site Specific Field Area |

## Module 6: Operate various Equipment related to Environmental Technology

**Objective of the module:** After completing this module, the learner will be able to assisting in Operate various Equipment related to Environmental Technology.

**Duration:** 140 hrs. **Theory:** 20 hrs. **Practical:** 90 hrs.

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1:** Select equipment for Physical, Chemical and Biological analysis | **The trainee will be able to:**<br>**1.** Select equipment for water analysis<br>**2.** Select equipment required for soil analysis<br>**3.** Select equipment for air analysis | • Physical Quality Parameter Equipment (pH meter, EC meter, Air Sampler, etc.)<br>• Chemical Quality Parameter Equipment (Ambient Air Analyser, Conductivity Meter, Kjeldahl Apparatus, Spectrophotometer, etc.)<br>• Biological Quality Parameter Equipment (Colorimeters, Photometers, BOD Analyser, Incubator, Autoclave, etc.)<br>• Working Principles of different Equipment<br>**Practical Activity:** | **Total:** 51hrs<br>**Theory:** 9hrs<br>**Practical:** 42hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment for sampling<br>• Filters<br>• Sand papers<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs<br>• PH meter, EC meter, Air Sampler, etc.) | Class Room/ Site Specific Field Area |

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| | | **1.** Prepare a presentation using MS PowerPoint, including: Brief details of the equipment used for Biological, Chemical and Physical Quality Parameters with Pictures. | | • Chemical Quality Parameter Equipment (Ambient Air Analyser, Conductivity Meter, Kjeldahl Apparatus, Spectrophotometer, etc.)<br>• Colorimeters, Photometers, BOD Analyser, Incubator, Autoclave, etc.) | |
| **LU2:** Check ~~smooth~~ operations of equipment | The trainee will be able to:<br>**1.** Check performance of the equipment before use<br>**2.** Follow Original Equipment Manufacturer (OEM) guidelines<br>**3.** Ensure the calibration of equipment | • (OEM) guidelines<br>• Calibration of equipment<br>**Practical Activity:**<br>**1.** Perform Calibration of pH Meter with appropriate Buffer | **Total:** 65hrs<br>**Theory:** 9hrs<br>**Practical:** 56hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment for sampling<br>• Filters<br>• Sand papers<br>Non Consumable<br>• White board | Class Room/ Site Specific Field Area |

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| | | **1.** Write down work instruction of given Equipment from manual | | • Multimedia<br>• Internet<br>• Computer system | |
| **LU3:** Operate Equipment Safely | **The trainee will be able to:**<br>**1.** Use PPEs to ensure safety<br>**2.** Follow the safety guidelines associated with equipment<br>**3.** Disinfect the glassware/equipment as per requirement<br>**4.** Operate equipment safely for required test/analysis<br>**5.** Store equipment appropriately after use | • Safety Guidelines<br>• Precautionary measures<br>• Maintenance and storage of equipment<br>**Practical Activity:**<br>**1.** Take Mean Value of Turbidity by using Turbidity Meter | **Total:** 24hrs<br>**Theory:** 3hrs<br>**Practical:** 21hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>• Lab equipment for sampling<br>• Filters<br>• Sand papers<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs<br>• Maintenance tools | Class Room/ Site Specific Field Area |

## Module 7: Inspect and maintain equipment

**Objective of the module:** After completing this module, the learner will be able to perform inspection and maintenance of equipment related to environmental technology.

**Duration:** 80 hrs. **Theory:** 20 hrs. **Practical:** 60 hrs.

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1:** Conduct Inspection of equipment | **The trainee will be able to:**<br>**1.** Identify the equipment<br>**2.** Identify equipment issues through inspections according to standard operating procedure.<br>**3.** Detect damage or fault in equipment<br>**4.** Separate the faulty equipment | • Inspection of Equipment/Instruments as Per Standards<br>• Possible Damages or faults<br>**Practical Activity:**<br>**1.** Inspect given equipment/instrument and report the faults/damages | **Total:** 20hrs<br>**Theory:** 05hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |

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| **LU2:** Check calibration of equipment | **The trainee will be able to:**<br>**1.** Determine the status of calibration<br>**2.** Compare equipment measurement with standard value<br>**3.** Follow SOPs for Calibration<br>**4.** Request for equipment calibration<br>**5.** Label the calibrated equipment | • Calibration Standards<br>• Methods of Calibration<br>• Reference Standards for calibration<br>• Labelling of the calibrated equipment<br>**Practical Activity:**<br>**1.** Check Zero Status/Baseline of given Equipment<br>**2.** Perform self-calibration/Zeroing of Equipment<br>**1.** Calibrate given equipment and write down the Standard Operating Procedures | **Total:** 20hrs<br>**Theory:** 05hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |
| **LU3.** Rectify the faults and damages | **The trainee will be able to:**<br>**1.** Identify any minor and major faults in equipment | • Importance of servicing and maintenance of Equipment<br>• Minor and major faults | **Total:** 20hrs<br>**Theory:** 05hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers | Class Room/ Site Specific Field Area |

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| | **2.** Repair minor faults through servicing and maintenance<br>**3.** Prepare a requisition for repairing of equipment's major fault servicing | **Practical Activity:**<br>**1.** Detect a Minor or Major faults in given equipment and prepare a report<br>**2.** Perform servicing and maintenance of given equipment | | • Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | |
| **LU4.** Ensure preventive and corrective maintenance | **The trainee will be able to:**<br>1. Prepare schedule and perform regular inspections of equipment accordingly<br>2. Conduct regular cleaning of equipment<br>3. Lubricate moving parts to reduce friction<br>4. Adjust controls for optimal performance and energy efficiency<br>5. Repair and replace any defective part of equipment | • Importance of Preventive and Corrective Measures for equipment<br>• Importance of Schedule Servicing and Maintenance of Equipment<br>**Practical Activity:**<br>**1.** Perform Preventive and Corrective Measures of given equipment | **Total:** 20hrs<br>**Theory:** 05hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |

## Module 8: Generate Operational and Maintenance Report

**Objective of the module:** After completing this module, the learner will be able to prepare operational and maintenance report.

**Duration:** 90 hrs. **Theory:** 20 hrs. **Practical:** 60 hrs.

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1:** Collect data for report | **The trainee will be able to:**<br>**1.** Identify sources for data collection<br>**2.** Follow SOPs for data collection<br>**3.** Plan an approach and methods<br>**4.** Collect data | • Data Collection Methods | **Total:** 30hrs<br>**Theory:** 10hrs<br>**Practical:** 20hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |
| **LU2:** Generate operational report | **The trainee will be able to:**<br>**1.** Collect operational data | • Operational Report drafting | **Total:** 25hrs<br>**Theory:** 05hrs | Consumable<br>• Notebooks | |

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| | **2.** Draft the report<br>**3.** Get it verified from supervisor | | **Practical:** 20hrs | • Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |
| **LU3.** Generate maintenance report | **The trainee will be able to:**<br>**1.** Collect maintenance data<br>**2.** Draft the report<br>**3.** Get it verified from supervisor | • Maintenance Report drafting | **Total:** 25hrs<br>**Theory:** 05hrs<br>**Practical:** 20hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system | Class Room/ Site Specific Field Area |

## Module 9: Manage Waste at Site

**Objective of the module:** The aim of this module to get knowledge, skills and understanding to Manage Waste Materials at Workplace

**Duration:** 90 hours **Theory:** 30 hours **Practical:** 60 hours

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1:** Characterize the final waste | **The trainee will be able to:**<br>**1.** Understand the composition of waste.<br>**2.** Sort the generated waste (Fabric waste, Chemical waste, Paper waste, etc.) at workplace<br>**3.** Maintain record of reusable materials | • Types of generated waste (Fabric waste, Chemical waste, Paper waste, etc.) at workplace<br>• Recycle & reusable materials<br>• Segregate the scrap according to material (Fabric, lining, inter-lining/fusing, thread, paper, card sheets, pigment and dyes, chemicals, etc.)<br>• Follow safety precautions related to waste handling | **Total:** 45hrs<br>**Theory:** 15hrs<br>**Practical:** 30hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |
| **LU2:** Arrange Waste Materials at Workplace for the appropriate | **The trainee will be able to:**<br>**1.** Arrange waste material for disposal | • Importance of waste control benefits | **Total:** 45hrs<br>**Theory:** 15hrs<br>**Practical:** 30hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers | Class Room/ Site Specific Field Area |

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| disposal procedure | **2.** Plan green waste management practices | • Waste reduction techniques<br>• Explain the processes of waste disposal (Shredding, Baling, incineration (burning) or Land filling, etc.)<br>• Understand Eco-friendly raw material<br>• Understand Eco-manufacturing measures | | • Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | |

## Module 10: Act as a liaison between Operational Staff and Management

**Objective of the module:** After completing this module, the learner will be able to Act as a liaison between Operational Staff and Management

**Duration:** 60 hours **Theory:** 20 hours **Practical:** 40 hours

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Communicate effectively with team | **The trainee will be able to:**<br>**1.** Use team communication channels<br>**2.** Practice effective listening<br>**3.** Communicate feedback<br>**4.** Act as a bridge between senior and junior staff | • Define the term 'communication'<br>• Enlist 7C's of communication<br>• Define the term 'active listening'<br>• Describe the importance of team communication in an organization | **Total:** 25hrs<br>**Theory:** 10hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |
| **LU2.** Attend meetings with the management | **The trainee will be able to:**<br>**1.** Discuss the meeting agenda with the supervisor<br>**2.** Communicate purpose of meeting with team<br>**3.** Record minutes of meeting | • Purpose of meeting<br>• Minutes of meeting | **Total:** 25hrs<br>**Theory:** 05hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board | Class Room/ Site Specific Field Area |

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|---|---|---|---|---|---|
| | | | | • Multimedia<br>• Internet<br>• Computer system<br>• PPEs | |
| **LU3.** Assist in resolving team issues | **The trainee will be able to:**<br>**1.** Record the issues discussed in meeting<br>**2.** Assist top management in finding out correction plans for relevant issues<br>**3.** Assist in implementing the correction plan | • Importance of recording issues<br>• Correction plans | **Total:** 25hrs<br>**Theory:** 05hrs<br>**Practical:** 15hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |

## Module 11: Assist the Supervisor in Cost Analysis related to Operations and Maintenance

**Objective of the module:** After completing this module, the learner will be able to assist the Supervisor in Cost Analysis related to Operations and Maintenance

**Duration:** 70 hours **Theory:** 20 hours **Practical:** 50 hours

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Keep the record of operational costs | **The trainee will be able to:**<br>**1.** Enlist the operational activities<br>**2.** Identify costs and benefits of operational procedures<br>**3.** Estimate costs and benefits of operational activities<br>**4.** Assign a monetary value to the costs and benefits<br>**5.** Compare costs and benefits | • Define the term 'Cost-Benefit analysis'<br>• Describe the importance of cost benefit analysis | **Total:** 31hrs<br>**Theory:** 10hrs<br>**Practical:** 21hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |
| **LU2.** Keep the record of maintenance cost | **The trainee will be able to:**<br>**1.** Enlist the maintenance activities<br>**2.** Identify costs and benefit of maintenance procedures | • Describe monetary value<br>• Costs and benefit of maintenance procedures | **Total:** 23hrs<br>**Theory:** 05hrs<br>**Practical:** 18hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable | Class Room/ Site Specific Field Area |

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| | **3.** Make a list of costs and benefits<br>**4.** Assign a monetary value to the costs and benefits<br>**5.** Compare costs and benefits | | | • White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | |
| **LU3.** Forward the cost analysis data to the Supervisor | **The trainee will be able to:**<br>**1.** Compile the data for operational and maintenance cost analysis<br>**2.** Forward the data to the Supervisor | • Compilation of cost analysis | **Total:** 16hrs<br>**Theory:** 05hrs<br>**Practical:** 11hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |

## Module 12: Assist in Regulatory Compliance and other Duties

**Objective of the module:** After completing this module, the learner will be able to assist the assist in Regulatory Compliance and other Duties.

**Duration:** 50 hours **Theory:** 10 hours **Practical:** 40 hours

| Learning Unit | Learning Outcomes | Learning Elements | Duration | Materials Required | Learning Place |
|---|---|---|---|---|---|
| **LU1.** Follow applicable regulations | **The trainee will be able to:**<br>**1.** Identify applicable national regulations<br>**2.** Assist in implementation of applicable regulations | • Define the term 'compliance'<br>• Explain compliance management<br>• Define the term 'audit'<br>• Describe types of audits | **Total:** 20hrs<br>**Theory:** 06hrs<br>**Practical:** 14hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |
| **LU2.** Document compliance processes | **The trainee will be able to:**<br>**1.** Stay updated with changing laws and regulations<br>**2.** Assist supervisor in implementation of SOPs | • Laws and regulations<br>• Describe various legal requirements of environmental parameters | **Total:** 20hrs<br>**Theory:** 02hrs<br>**Practical:** 14hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board | Class Room/ Site Specific Field Area |

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| | **3.** Assist in scheduling regular internal audits<br>**4.** Assist supervisor in documentation of compliance | | | • Multimedia<br>• Internet<br>• Computer system<br>• PPEs | |
| **LU3.** Maintain the record | **The trainee will be able to:**<br>**1.** Keep record for compliance<br>**2.** Use software to store data electronically<br>**3.** Follow retention time of record keeping | • Protocols to maintain record | **Total:** 14hrs<br>**Theory:** 02hrs<br>**Practical:** 12hrs | Consumable<br>• Notebooks<br>• Pencils<br>• Erasers<br>• Sharpeners<br>Non Consumable<br>• White board<br>• Multimedia<br>• Internet<br>• Computer system<br>• PPEs | Class Room/ Site Specific Field Area |

## General assessment guidance for *Environmental Technology*

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

**Sessional Assessment** is going on all the time. Its purpose is to provide feedback on what students are learning:

- To the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

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

**Final Assessment** is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

### Methods of Assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.
Examples for direct assessment of a Pesticides& Fertiliser Technology include:

- Work performances, for example communication at workplace, application of work health and safety practices (WHS), performing basic computer operations, and identification of and implement Workplace Policies and Procedures.
- Demonstrations, for example Assist in Maintenance of Equipment
- Direct questioning, where the assessor would ask the student how to Observe Workplace Ethics-I

- Paper-based tests, such as multiple choice or short answer questions on Maintain Routine Record
- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of an Environmental Technology include:

- Perform Collect/Prepare Samples for Analysis

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

### Principles of Assessment

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

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess. For example, if Collect/Prepare Samples for Analysis Tasks are to be assessed and certificated, the assessment should involve performance criteria that are directly related to that documentation activity. An interview about the Collect/Prepare Samples for Analysis Tasks would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of preparing documents in words has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

## Assessment strategy for *Assistant Environmental Technician*

This curriculum consists of 07 modules:

- **Module 1:** Apply Occupational Health, Safety and Environmental (OHS&E) Regulations
- **Module 2:** Observe Work Place Ethics-II
- **Module 3:** Participate in field inspection and investigation
- **Module 4:** Analyze various Environmental Samples
- **Module 5:** Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples
- **Module 6:** Operate various Equipment related to Environmental Technology
- **Module 7:** Inspect and Maintain Equipment
- **Module 8:** Generate Operational and Maintenance Report
- **Module 9:** Manage Waste at Site
- **Module 10:** Act as a liaison between Operational Staff and Management
- **Module 11:** Assist the Supervisor in Cost Analysis related to Operations and Maintenance
- **Module 12:** Assist in Regulatory Compliance and other Duties

## Sessional Assessment

The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

## Final Assessment

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

## The Assessment Team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 25 students shall therefore require

assessments to be carried out over a four-day period. For a group of only 10 to 15 students, assessments would be carried out over a two-day period only.

## Planning for Assessment

**Sessional Assessment:** assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

**Final Assessment:** Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree the content for practical assessments in advance.

## Complete List of Tools and Equipment

| Sr no | Description | Quantity |
|---|---|---|
| **1** | Computer with relevant software and internet | 26 |
| **2** | Printer | 1 |
| **3** | Multi media | 1 |
| **4** | Whiteboard | 1 |

## List of Consumable Supplies

| Sr no | Material | Quantity |
|---|---|---|
| **1.** | Note books | 25 |
| **2.** | Eraser | 25 |
| **3.** | Pencils | 25 |
| **4.** | Sharpener | 25 |
| **5.** | White Board | 1 |
| **6.** | Board markers | 15 |
| **7.** | Dusters | 5 |
| **8.** | Cleaning solutions | - |
| **9.** | Disinfecting chemicals | - |

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|---|---|---|
| **10.** | Sprayer | 25 |
| **11.** | Mops | 25 |
| **12.** | Waste buckets | 5 |
| **13.** | Cleaning brush | 25 |
| **14.** | Warning signs | - |
| **15.** | Personal Protective Equipment (PPEs) | 25 |
| **16.** | Air monitoring equipment (CO/CO2 monitor, SOx monitor, NOx monitor, Swab kit, Particle analyzer etc.) | 1 |
| **17.** | Noise Meter | 5 |
| **18.** | pH meter | 5 |
| **19.** | TDS meter | 5 |
| **20.** | TSS meter | 5 |
| **21.** | TSP meter | 5 |
| **22.** | DO meter | 5 |
| **23.** | Titration assembly | 5 |
| **24.** | Vibration analyzer | 5 |
| **25.** | Sound level meter | 5 |
| **26.** | Temperature gauges | 5 |

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|---|---|---|
| **27.** | Glassware/Plastic ware | 5 |
| **28.** | Weighing balance | 5 |
| **29.** | Tags/Label | 5 |
| **30.** | Containers/Storage boxes | 5 |
| **31.** | Inventory checklist | 25 |
| **32.** | Emergency signs | - |
| **33.** | Emergency hooters | - |
| **34.** | First aid kit | 5 |
| **35.** | Fire extinguishers | 5 |
| **36.** | Smoke detectors | 5 |
| **37.** | Megaphone | 3 |
| **38.** | Oil spillage kit | 5 |
| **39.** | Survey checklist | 5 |
| **40.** | SOP manual | 5 |
| **41.** | Policy and procedure documents | 25 |
| **42.** | Slogans placards | 25 |
| **43.** | Multimedia | 1 |
| **44.** | PPE’s | |

## Credit Values

The credit value of the National Certificate Level 3 in Textile Merchandizing is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines.

The credit values are as follows:

| Competency Standard | Credit | Estimate of hours |
|---|---|---|
| **A.** Apply Occupational Health, Safety and Environmental (OHS&E) Regulations | 11 | 110 |
| **B.** Observe Work Place Ethics-II | 8 | 80 |
| **C.** Participate in field inspection and investigation | 15 | 150 |
| **D.** Analyze various Environmental Samples | 15 | 150 |
| **E.** Perform Physical, Chemical and Biological Tests on Air, Water and Soil Samples | 14 | 140 |
| **F.** Operate various Equipment related to Environmental Technology | 14 | 140 |
| **G.** Inspect and maintain equipment | 8 | 80 |

| Competency Standard | Credit | Estimate of hours |
|---|---|---|
| **H.** Generate Operational and Maintenance Report | 8 | 80 |
| **I.** Manage Waste at Site | 9 | 90 |
| **J.** Act as a liaison between Operational Staff and Management | 6 | 60 |
| **K.** Assist the Supervisor in Cost Analysis related to Operations and Maintenance | 7 | 70 |
| **L.** Assist in Regulatory Compliance and other Duties | 5 | 50 |