

## ENVIRONMENTAL PRINCIPLES

**ISCED UNIT CODE:** 0521 441 08A

**TVETCDACC UNIT CODE:** ENV/CU/ENT/CC/04/5/MA

**UNIT DURATION:** 100 HOURS

### Relationship to Occupational Standards

This unit addresses the Unit of Competency: **Apply environmental principles**

### Unit Description

This unit covers the competencies required to applying environmental principles, it involves applying basic environmental principles, determining energy flow in an ecosystem, applying environmental ethics and values, applying environmental impact assessment principles, applying environmental legislations, applying environmental research techniques.

### Summary of Learning Outcomes

By the end of this unit the learner should be able to:

S/No	Learning Outcomes	Duration (Hours)
1.	Apply basic environmental principles	10
2.	Determine energy flow in an ecosystem	20
3.	Apply environmental ethics and values	20
4.	Apply environmental impact assessment principles	20
5.	Apply environmental legislations,	10
6.	Apply environmental research techniques.	20
<b>Total</b>		<b>100</b>

### Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. apply basic environmental principles	<b>Theory</b> 1.1 Environmental Principles components 1.1.1 Definition of terms 1.1.2 Components of environment 1.2 Types of environmental resources 1.3 Genetics of Organisms 1.3.1 Introduction to genetic principles 1.3.2 Genetic diversity in plants and animals and its importance in conservation 1.3.3 National Biosafety Regulation Guidelines 1.3.4 Genetics Research on Plants and Animals 1.3.4.1 Techniques for genetic studies 1.3.4.2 Ethical considerations in genetic modification and biodiversity conservation.	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Written tests</li> <li>• Individual/group assignment</li> <li>• Projects</li> <li>• Interviews/ Oral questions</li> <li>• Third party</li> <li>• Case Studies</li> </ul>

	<p>1.4 Environmental resource conflict management</p> <p>1.4.1 Sources of Environmental Resource Conflicts</p> <p>1.4.2 Conflict Resolution Mechanisms</p> <p>1.4.3 Resource Conflict Management</p> <p>1.5 Resource Conservation Plans</p> <p>1.5.1 Types of Resource Conservation</p> <p>1.5.2 Types of Resource Conservation Strategies</p> <p>1.5.3 Implementation of Conservation Plans</p> <p><b>Practice</b></p> <p>1.6 Identify Sources of Environmental conflicts and their resolution</p>	
2. Determine energy flow in an ecosystem	<p><b>Theory</b></p> <p>2.1 Ecosystem energy flow</p> <p>2.1.1 Definition and Classification of Ecosystems</p> <p>2.1.2 Indicators of Ecosystem Health</p> <p>2.2 Ecological interaction</p> <p>1.1.1. Types of Ecological Interactions</p> <p>1.1.2. Assessing Ecological Interactions</p> <p>1.1.3. Techniques for monitoring</p> <p>2.3 Bio-geochemical Cycle</p>	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Written tests</li> <li>• Individual/group assignment</li> <li>• Projects</li> <li>• Interviews/ Oral questions</li> <li>• Third party</li> <li>• Case Studies</li> </ul>

	<p>2.3.1 carbon cycle</p> <p>2.3.2 The nitrogen cycles</p> <p>2.3.3 The phosphorus cycle ecosystems</p> <p>2.3.4 The water cycles</p> <p>2.4 Guidelines for Monitoring Bio-geochemical Cycles</p> <p>2.5 Impact of Bio-geochemical Cycles</p> <p><b>Practice</b></p> <p>2.6 Conduct field studies to observe and record ecological interactions</p>	
3. Apply environmental ethics and values	<p><b>Theory</b></p> <p>3.1 Environmental Legislations on Conservation</p> <p>3.1.1 Major international environmental agreements and protocol</p> <p>3.1.2 Environmental principles</p> <p>3.2 Multilateral Environmental Agreements</p> <p>3.2.1 Purpose of MEAs in promoting environmental sustainability</p> <p>3.2.2 Significant MEAs</p> <p>3.2.3 Implementation and Monitoring of MEAs</p> <p>3.3 Local ordinances on resource use</p> <p>3.3.1 Local Ordinances and International Laws</p> <p>3.3.2 Challenges in Harmonizing Local and International Laws</p> <p>3.3.3 process of implementing local ordinances</p>	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Written tests</li> <li>• Individual/group assignment</li> <li>• Projects</li> <li>• Interviews/ Oral questions</li> <li>• Third party</li> <li>• Case Studies</li> </ul>

	<p>3.4 Environmental ethics on resource consumption</p> <p>3.4.1 Principles of Environmental Ethics</p> <p>3.4.2 International Laws Promoting Ethical Resource Use</p> <p>3.4.3 Cultural Perspectives on Environmental Ethics</p> <p><b>Practice</b></p> <p>3.5 Practice the implementation of multilateral agreements</p>	
4. apply environmental impact assessment principles	<p><b>Theory</b></p> <p>4.1 Environmental Impact Assessment</p> <p>4.1.1 Definition of terms</p> <p>4.1.1.1 EIAs</p> <p>4.1.2 Importance of mapping in Environmental Impact Assessments (EIAs)</p> <p>4.1.3 Steps of EIAs</p> <p>4.1.4 EMCA 2003 (Amended 2019) Regulations on Mapping</p> <p>4.2 Baseline Data Collection Tools</p> <p>4.2.1 Data Collection Tools</p> <p>4.2.2 Data Collection Protocols</p> <p>4.3 Baseline Parameters</p> <p>4.3.1 Baseline Environmental Parameters</p> <p>4.3.2 Methods and tools used to measure each parameter</p> <p>4.3.3 4.3.3 Legal requirement</p> <p>4.4 Project Legal and Legislative Framework</p>	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Written tests</li> <li>• Individual/group assignment</li> <li>• Projects</li> <li>• Interviews/ Oral questions</li> <li>• Third party</li> <li>• Case Studies</li> </ul>

	<p>4.4.1 Environmental Legal Framework</p> <p>4.4.2 Project-Specific Legal Requirements</p> <p>4.5 Potential Environmental Impacts</p> <p>4.5.1 Types of environmental impacts</p> <p>4.5.2 Tools for impact identification</p> <p>4.5.3 Guidelines for Impact Identification</p> <p>4.6 Project Stakeholders</p> <p>4.6.1 Project key Stakeholders</p> <p>4.6.2 Importance of stakeholder engagement in environmental assessment</p> <p>4.6.3 Role of Stakeholders in EIAs:</p> <p>4.7 Public Participation Data Collection</p> <p>4.7.1 Methods for collecting public participation data for EIAs</p> <p>4.7.2 Importance of public participation in EIAs</p> <p>4.7.3 Guidelines for Public Participation</p> <p>4.8 Environmental Mitigation Measures</p> <p>4.9 Baseline Data Collection Tools maintenance</p> <p>4.9.1 Tool Maintenance Procedures</p> <p>4.10 Monitoring Environmental Outcomes</p> <p>4.10.1 Monitoring techniques</p>	
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	<b>Practice</b> <b>4.11</b> conduct baseline data collection, impact identification, mitigation planning	
5. Apply environmental legislations	<b>Theory</b> 5.1 Environmental legislation <div> 5.1.1 Definition and significance of environmental legal frameworks 5.1.2 Key principles and objectives of The Environmental (Impact Assessment and Audit) Regulations, 2003 5.1.3 Role of <b>NEMA</b> (National Environment Management Authority) in enforcing regulations. </div> 5.2 Environmental Legal and Legislative Frameworks 5.3 Environmental Legislation's Compliance <div> 5.3.1 Monitoring and compliance 5.3.2 Procedure for conducting environmental audits 5.3.3 Consequences of Non-Compliance </div> <b>Practice</b> 5.4 Develop a mock compliance monitoring plan for an ongoing project 5.5 Conduct an environmental audit and write a report	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Written tests</li> <li>• Individual/group assignment</li> <li>• Projects</li> <li>• Interviews/ Oral questions</li> <li>• Third party</li> <li>• Case Studies</li> </ul>
6. Apply environmental research techniques	<b>Theory</b> 6.1 Environmental Research Techniques	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Written tests</li> </ul>

	<p>6.1.1 Criteria for Selecting Environmental Study Areas</p> <p>6.1.2 Mapping Techniques and Tools</p> <p>6.1.3 Steps in Mapping Environmental Study Areas</p> <p>6.2 Environmental Samples</p> <p>6.2.1 Introduction to Standard Operating Procedures (SOPs)</p> <p>6.2.2 Types of Environmental Samples</p> <p>6.2.3 Tools for environmental sample collection</p> <p>6.2.4 Environmental Sample Collection Procedures</p> <p>6.2.5 Sample Preservation and Transportation</p> <p>6.2.6 Sample Preparation for Analysis</p> <p>6.2.7 Challenges in Sample Preparation</p> <p>6.3 Data Collection</p> <p>6.3.1 Data Collection requirements</p> <p>6.3.2 Types of Data Collected</p> <p>6.3.2.1 Quantitative Data</p> <p>6.3.2.2 Qualitative Data</p> <p>6.3.3 Data Collection Methodologies</p> <p>6.3.4 Ethical Considerations</p>	<ul style="list-style-type: none"> <li>• Individual/group assignment</li> <li>• Projects</li> <li>• Interviews/ Oral questions</li> <li>• Third party</li> <li>• Case Studies</li> </ul>
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	<p>6.4 Specimen findings</p> <p>6.4.1 Importance of Recording Specimen Findings</p> <p>6.4.2 Institutional SOPs for Record-Keeping</p> <p>6.4.3 Data Management Systems</p> <p>6.5 Documenting Environmental Observations</p> <p>6.5.1 Importance of Documenting Environmental Observation</p> <p>6.5.2 SOPs for Environmental Observations</p> <p>6.5.3 Documentation Techniques</p> <p>6.6 Importance of Tool Maintenance Practice</p> <p>6.7 Conduct environmental observations and document them following SOPs.</p>	
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### Suggested Methods of Instruction

- Demonstration
- Role playing
- Group discussion
- Direct instruction

### Recommended Resources for 25 trainees

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)

<b>A</b>	<b>Learning Facilities &amp; infrastructure</b>			
1.)	Lecture/theory room		1	1:25
<b>B</b>	<b>Tools and Equipment</b>			
1.)	Sampling equipment		25 pcs	1:1
2.)	pH meters		25 pcs	1:1
3.)	Temperature probes		25 pcs	1:1
4.)	Moisture meters		25 pcs	1:1
5.)	Camera traps		10 pcs	1:3
6.)	Air quality monitors		5 pcs	1:5

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