MONITOR CLIMATE CHANGE

ISCED UNIT CODE: 0521 451 09A

TVET CDACC UNIT CODE: ENV/OS/ENT/CR/04/5/MA

UNIT DESCRIPTION

This unit covers the competencies required to monitor climate impact assessment. It involves carrying out weather data collection, monitoring greenhouse gas emissions and creating awareness on climate change.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace functions	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements (Bold and italicized terms are elaborated in the range)
1.Carryout weather data collection	1.1 ***Weather Forecasting instruments*** are assembled as per work requirement 1.2 Weather Forecasting instruments are installed as per national framework for climate service 2023 (NFCS) 1.3 Weather patterns are recorded as per NFCS 2023 1.4 Weather forecasting instruments are maintained as per work requirements.
2.Monitor greenhouse gas emissions	2.1 ***Greenhouse gas determination tools*** are assembled as per Climate Change (Amendment) Act, 2023; Kyoto Protocol 2.2 ***Greenhouse gas emission measurements*** are carried out as per The Climate Change (Amendment) Act, 2023;Kyoto Protocol 2.3 Greenhouse gas emission measurements are recorded as per The Climate Change (Amendment) Act, 2023 2.4 Greenhouse gas emission reduction awareness is carried out as per work guidelines. 2.5 Greenhouse gas emission is monitored as per Climate Change (Amendment) Act, 2023
3.Create awareness on climate change	3.1 Climate change awareness data collection is carried out as per work procedures 3.2 Climate change awareness is carried out as per work procedures 3.3 ***climate change intervention measures*** are carried out as per work procedures

RANGE

This section provides a work environment and conditions to which the performance criteria apply. It allows for a different work environment and situations that will affect performance.

Variable	Range
Weather Forecasting instruments may include but not limited to:	• Sechi disc • Rain gauge • Wind vane • Hygrometer • Anemometer • Windsock • Lightning detector • Thermometer
Greenhouse gases may include are not limited to:	• Carbon dioxide • Methane • Nitrous oxide • Fluorinated gases • Water vapor
Greenhouse gas determination tools may include, but are not limited to:	• TDLAS technology monitors • Differential Optical Absorption Spectroscopy (DOAS) • Infrared Gas Analyzer (IRGA) • Photoacoustic Spectroscopy (PAS) • Cavity Ring-Down Spectroscopy (CRDS) • Gas Chromatographs (GC) • Varied Gas Analyzers • Gas Chromatographs and Mass Spectroscopy (GC-MS)
Greenhouse gas emission measurements may include but are not limited to	• Device independent method • Sampling devices • biochemical reactions
Climate change intervention measures may include, but are not limited to:	• Promoting green energy • Afforestation and Reforestation • Sustainable agriculture • improved public transport • Waste management practices • Promote green technology • Carbon pricing • Education and awareness

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required knowledge

The individual needs to demonstrate knowledge of:

- Greenhouse gas emissions
- greenhouse gas measurements tools
- Greenhouse gas measurements
- Climate Change intervention measures
- Weather forecasting
- weather forecasting instruments

Required skills

The individual needs to demonstrate the following skills:

- Performing installation
- Data recording skills
- Monitoring skills
- Measurement skills
- Observation skills
- Report skills
- Interpersonal skills
- Presentation skills

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1.Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Assembled ***weather Forecasting instruments*** are as per work requirement 1.2 Recorded weather patterns as per NFCS 2023 1.3 Carried out ***greenhouse gas emission measurements*** as per The Climate Change (Amendment) Act, 1.4 Carried out greenhouse gas emission reduction awareness as per work guidelines. 1.5 Monitored greenhouse gas emission as per Climate Change (Amendment) Act, 2023 1.6 Carried out climate change awareness as per work procedures 1.7 Carried out ***climate change intervention measures*** as per work procedures

2.Resource implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activity or tasks
3.Methods of assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written Assessments 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report 3.7 presentation 3.8 Practical assessment
4.Context of assessment	Competency may be assessed: 4.1 Workplace 4.2 Simulated work environment
5.Guidance information for assessment	Holistic assessment with other units relevant to the industry sector and workplace job role is recommended.

RANGE

This section provides a work environment and conditions to which the performance criteria apply. It allows for a different work environment and situations that will affect performance.

Variable	Range
Sources of air pollution include but not limited to:	• Industrial • Anthropogenic
Air quality determination tools includes but not limited to:	• Aerosol photometer • Velocity meter. • Specialized Landfill Gas(LFG)systems • Multi gas monitors/Single Gas monitors • Gas Chromatogram • Wireless gas detector • Photo ionization detectors • Mercury vapour analyzer • High vacuum air samplers
Air quality emission measurements includes but not limited to:	• Ground level Ozone • Carbon (IV) Oxide • Carbon monoxide • Sulphur (IV) oxide • Nitrogen dioxide • Particulates • Ammonia • Methane • Chlorofluorocarbons • Volatile organic compounds (VOC) • Hydrocarbons • Hydrogen sulphide • Dioxins and furans
Water quality measurements include but not limited to:	• Biological Oxygen demand (BOD) • Chemical Oxygen demand (COD) • Conductivity • Total dissolved solids (TDS) • Turbidity • Dissolved Oxygen (DO) • pH • Salinity • Temperature • Total Suspended solids (TSS) • Total coliform

Soil quality sampling recommendations includes but not limited to:	• Mulching • Cover crops • Conservation tillage • Grassed waterways • Integrated pest management • Crop rotation • Contour farming • Strip cropping • Carbon farming • Agroforestry • permaculture • Biodynamic farming

Air pollution control measures includes but not limited to	• Green energy technologies
	  ○ Solar
	  ○ Wind
	  ○ Geothermal
	• Carbon sinks
	• Environmental plans and regulations

Water pollution control measures includes but not limited to:	• Water quality permits • Soil erosion control • Biological pest control techniques • Wastewater treatment • Regulation of effluents
Noise pollution sources includes but not limited to:	• Radio, TV, other sound amplifying devices • Parties and social events • Hawkers, peddlers, touts, street preachers • Machinery • Noise from motor vehicles • Construction at night • Noise, excessive vibrations from construction, demolition, mining or quarrying sites. • Environmental Impact Assessment
Noise pollution levels includes but not limited to:	• Silent Zone 40dBA • Places of worship 40 dBA • Residential: Indoor 45 dBA • Residential Outdoor 50 dBA • Mixed residential • (With some, commercial and places of entertainment) 55 dBA • E. Commercial 60 dBA

Treated includes but not limited to:	• Extraction and separation techniques • Thermal methods • Chemical methods • Microbial treatment methods
Sources of noise pollution include but not limited to:	• Night clubs • Industries • Vehicles
Noise pollution control measures includes but not limited to:	• Noise permits • Ear muffs are used in high noise areas • Industries are constructed away from residential areas • Closure notices • penalties • tree planting

REQUIRED KNOWLEDGE AND SKILLS

This section describes the knowledge and skills required for this unit of competency.

Required knowledge

The individual needs to demonstrate knowledge of:

- Types of pollutants
- Sources of pollution
- Permits
- Methods of pollution control
- Environmental laws, policies and regulations
- Pollution monitoring and evaluation tools
- Environmental degradation and pollution
- Safety precautions.
- Sustainable development goals

Required skills

The individual needs to demonstrate the following skills:

- Monitoring and evaluation
- sampling skills
- Recording skills
- Measuring skills
- Observation skills
- Problem-solving skills

- Sorting/Segregation wastes

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

1.Critical aspects of Competency	assessment requires evidence that the candidate: 1.1 Recorded ***air quality emission measurements*** as per EMCA Air quality regulations) 2014 1.2 Mapped point and non-point pollution sources as per EMCA (water quality) regulations, 2006 1.3 Carried out water quality sampling as per work procedures 1.4 Carried out ***water quality measurements*** as per work procedures. 1.5 Collected soil sample as per work procedures 1.6 Implemented soil ***quality sampling recommendations*** as per work procedures 1.7 Measured ***noise pollution levels*** based EMCA (noise pollution and excessive vibration) regulations 2009 1.8 Carried out environmental pollution awareness as per work procedures
2.Resource Implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written assessments 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report 3.7 Practical demonstrations
4.Context of Assessment	Competency may be assessed: 4.1 Workplace 4.2 Simulated work environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended