MICRO HYDRO POWER PLANT TECHNOLOGY

CBT Curriculum

National Vocational Certificate Level 1

Version 1 - July 2015

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Contents

1. Introduction

Today's 'World of Work' has undergone radical changes. The emergence of new technologies, global markets for products and services, and international competition require economies to upgrade and enhance the skill level of their human resources. Technical and Vocational Education and Training (TVET) systems all over the world are constantly challenged by this question of how to respond to the demand of a knowledge-based economy. As TVET systems and their training programmes directly relate to the world of work in terms of quantity and quality output, the approach of TVET programmes need to focus on the acquisition of technical and non-technical skills, also referred to employability skills.

With the release of the National Skills Strategy 2009-2013 the Pakistan government has made skills development a political priority. The framework for skills development aims to:

- Change TVET education from time-bound, curriculum-based training to flexible, competency-based training;
- Bring about a shift from supply-led training to demand-driven (outcome-based) skills development by promoting the role of industry in designing and delivering TVET.

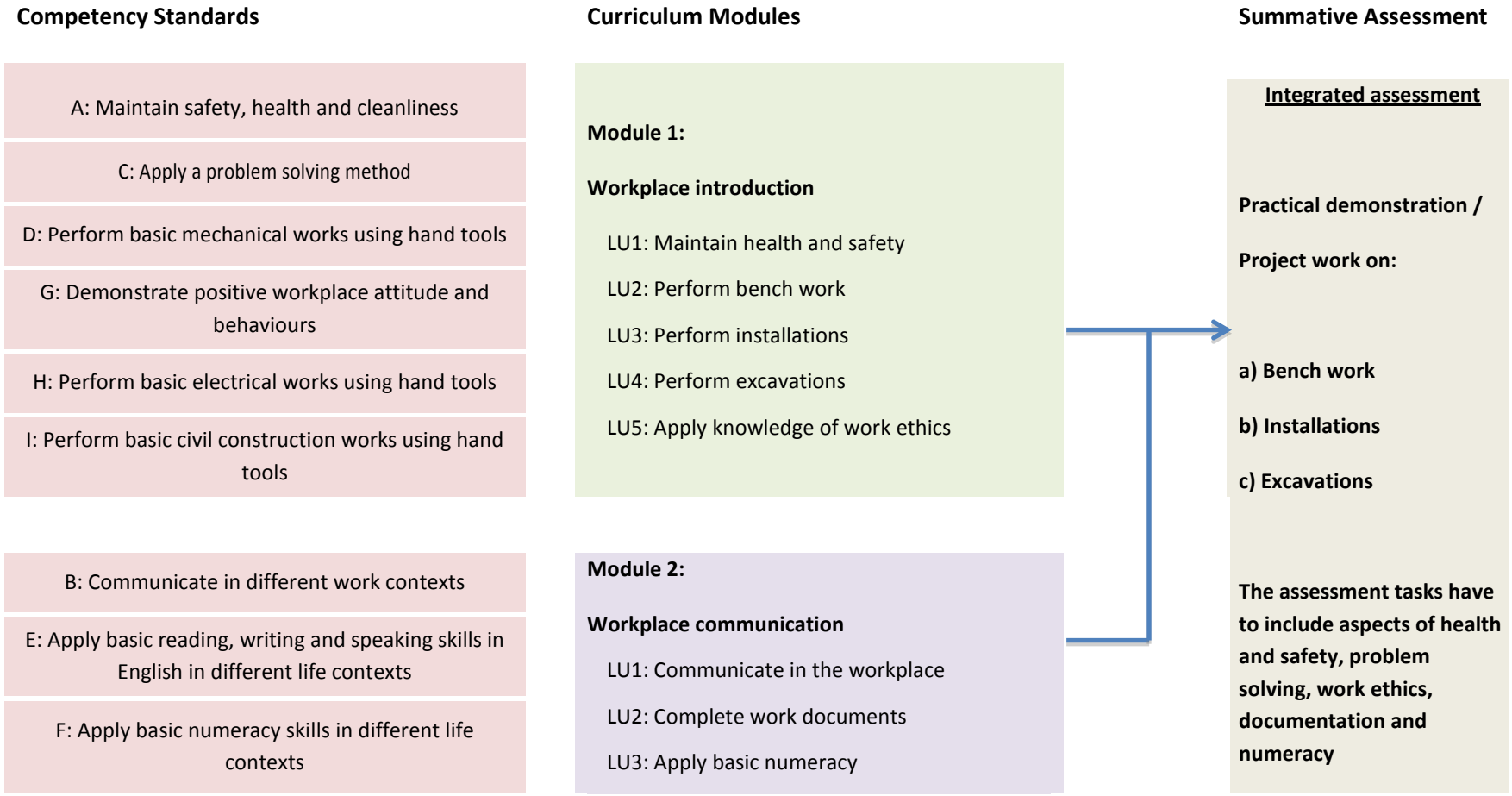
The curriculum for ***Micro Hydel Power Plant operations (Helper) – Level 1*** aims to respond to this demand. It has been developed as an outcome-based course designed to transfer employability skills needed to succeed in a high-performance work environment, as defined by labour market requirements. Although the course design is aimed for further progression to the Micro Hydel Power Plant operations (Assistant) - NVQF level 2 programme, it seamlessly articulates horizontally and vertically with other training programmes at NVQF level 1 and 2 in a number of Electrical trade areas. People who wish to go this route are advised to seek Recognition of Prior Learning for their achievements.

1.1 Course objective

The overall objective of this introductory course is to teach trainees transferable skills necessary to succeed in the ever-changing workplace through teamwork, problem solving, communication, and self-management. Trainees will enhance soft skills, basic workplace skills, interpersonal skills, communication skills, and leadership skills while becoming career-ready.

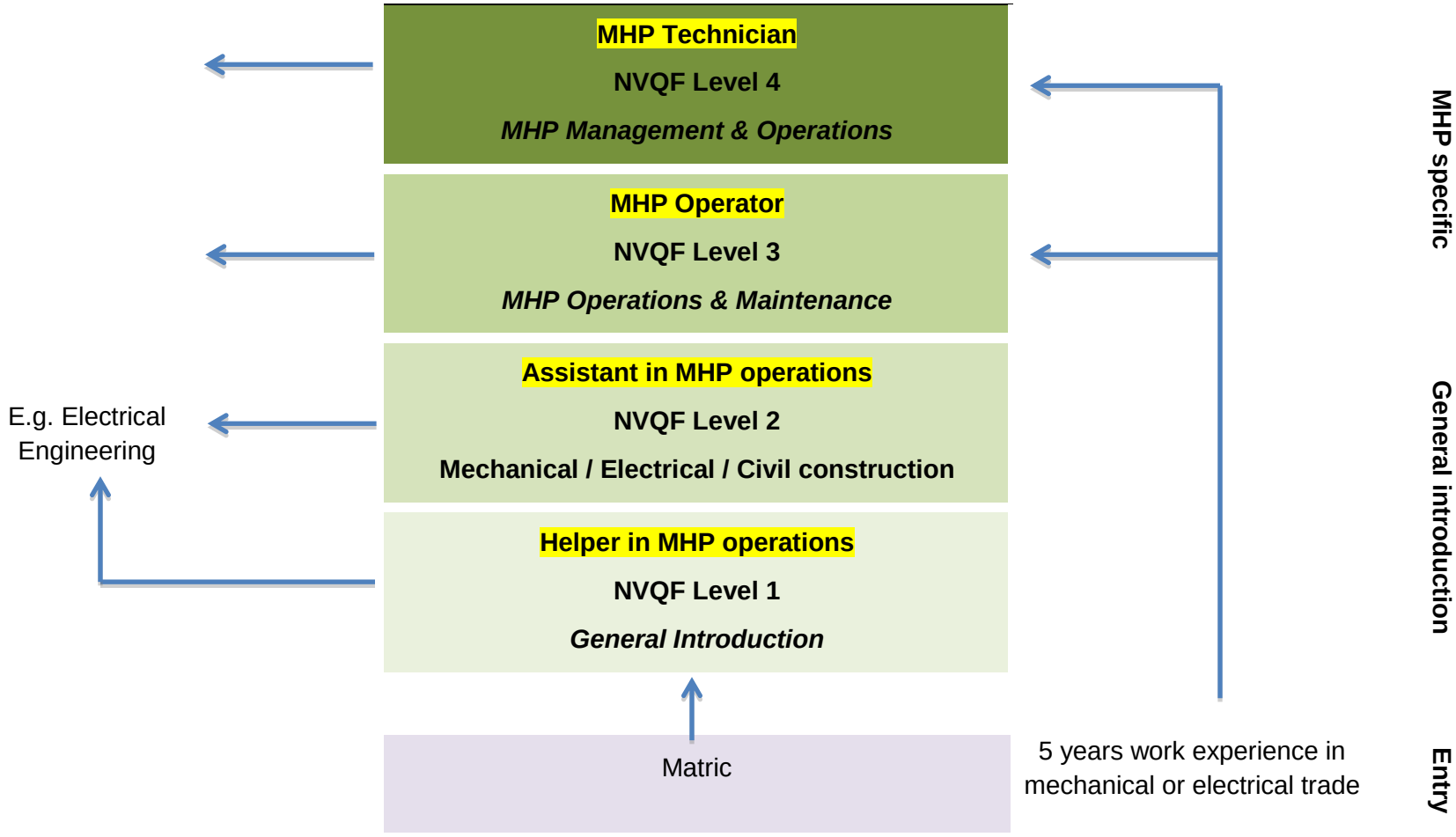
1.2 Course competencies

Curriculum modules (training input) are clusters of competencies expressed in learning units, learning outcomes, and learning elements. After successful completion of this course, the trainee has gained a range of competencies required to progress to the next NVQF level. The framework below reflects industry requirements expressed in competency standards (training output).



1.3 Job opportunities

The level 1 training course related to ***MHP operations (Helper)*** transfers work-readiness skills (employability skills) and articulates with a number of level 2 training programmes. Based on the design and flexible approach qualified trainees will find opportunities to continue their studies in MHP operations (Level 2) or persuade a career in e.g. Electrical Engineering as shown in the diagram below:



1.4 Trainee entry level

Individuals who wish to enter this course of study have to comply against the following criteria:

- Grade 9 (Matric) or equivalent;
- Comfort level of English language and mathematics;
- Satisfactory completion of appropriate admission assessment test/interview.

1.5 Trainer requirements

Trainers who wish to offer this programme should meet one of the following requirements:

- B.Sc. Eng. and 2 years of relevant work experience; or
- B-Tech and 4 years of relevant work experience; or
- Diploma Associate Engineer (DAE) and 5 years relevant work experience; or
- Certificate issued by authentic authority/body as Electrician with a minimum of 5 years relevant work experience

Trainers offering this programme must be computer literate and be conversant with the delivery of competency-based education and training (CBET). All legislative requirements applicable to carry out training and assessment, if any, must be complied with.

1.6 Teaching strategies in a competency-based environment

Training in a competency-based environment differs from the traditional method of training delivery.It is based on defined competency standards, which are industry oriented.

The traditional role of a trainer changes and shifts towards the facilitation of training. A facilitator in CBET encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using specialist equipment, working on computers doing research on the Internet or the library. As trainees learn at different pace they might well be at different stages in their learning,thus learning must betailored to suit individual needs.

The following facilitation methods (teaching strategies) are generally employed in CBET programmes:

- **Direct Instruction Method:** This might beeffective when introducing a new topic to a larger group of trainees in a relative short amount of time. In most cases this method relies on one-way communication, hence there are limited opportunities to get feedback on the trainee's understanding.

- **Discussion Method:** This allows trainees to actively participate in sharing knowledge and ideas. It will help the trainer to determine whether trainees understand the content of the topic. On the other hand, there is a possibility ofstraying offtopic under discussion and some trainees dominating otherson their views.

- **Small Group Method:** Pairing trainees to help and learn from each other often results in faster knowledge/skill transfer than with the whole class. The physical arrangement of the classroom/workshop and individual assessment may be challenging.

- **Problem Solving Method:** This is avery popular teaching strategy for CBET. Trainees are challenged and are usually highly motivated when they gain new knowledge and skills by solvingproblems (Contingency skills). Trainees develop critical thinking skills and the ability to adapt to new learning situations (Transfer skills). It might be time consuming and because trainees sometimes work individually, they may not learn all the things that they are expected to learn.

- **Research Method:** This is used for workshops and laboratory tasks, field experiments, and case studies. It encourages trainees to investigate and find answers for themselves and to critically evaluate information. It however requires a lot of time and careful planning of research projects for the trainee.

1.7 Medium of instruction

Instructions will be provided in Urdu, local languages and/or English.

1.8 Sequence and delivery of the modules

The curriculum for ***Micro Hydel Power Plant operations (Helper) – NVQF level 1***, consists of two (2) modules and should be delivered in the following sequence:

Module 1: Workplace introduction

Learning units within this module can be delivered interchangeably as stand-alone modules or in a holistic approach

Module 2: Workplace communication

Learning units within this module can be delivered interchangeably as stand-alone modules or in a holistic approach

All theoretical content related to the modules should be delivered, where possible, in an applied setting related to the ***Micro Hydel Power Plant operations (Helper) – NVQF level 1*** work environment.

2. Overview about the programme: Curriculum for MHP operations (Helper) – NVQF Level 1

Module Title and Aim	Learning Units	Theory[1] hours	Workplace[2] hours	Timeframe of modules
Module 1: Workplace introduction ***Aim:*** To provide trainees with the knowledge and skills to safely carry out basic mechanical maintenance work related to MHP operations as Helper (Level 1)	**LU-1:** Maintain health and safety **LU-2:** Perform bench work **LU-3:** Perform installations **LU-4:** Perform excavations **LU-5:** Apply knowledge of work ethics	**80**	**280**	**360**
Module 2: Workplace communication ***Aim:*** To provide trainees with the knowledge and skills to effectively communicate verbally and non-verbally in a work environment	**LU-1:** Communicate in the workplace **LU-2:** Complete work documents **LU-3:** Apply basic numeracy	**20**	**60**	**80**

[1]Learning hours in training provider premises
[2]Training workshop, laboratory and on-the-job workplace

3. Curriculum Contents: *Micro Hydel Power Plant operations (Helper) – NVQF level 1*

Module 1:	**Workplace introduction – mechanical works**				
Objective of the Module:	On completion of this module the trainee will be able to demonstrate knowledge and skills according to the following competencies standards: • A: Maintain safety, health and cleanliness • C: Apply a problem solving method • D: Perform basic mechanical works using hand tools • G: Demonstrate positive workplace attitude and behaviours • H: Perform basic electrical works using hand tools • I: Perform basic civil construction works using hand tools				
Duration:	Total: 360 hours	Theory: 80 hours		Practice: 280 hours	
Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration (Hours)**	**Materials Required**	**Learning Place**
LU-1: **Maintain health and safety** *This learning unit addresses competency standard(s):* *A – A1/2/3/4** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	1.1 Define and identify the different types of hazards	Definition • Hazard Acute hazards Chronic hazards	**Total** 40 **Theory** 20 **Practical** 20	• Fire extinguisher • Fire blanket • Fire bucket • First Aid Box • Safety signage • Personal protective equipment and clothing • Teaching aids • Flip charts • Computer *(preferably with internet access)*	• Classroom • Workplace
	1.2 Describe the different ways of controlling and reporting hazards	• Elimination • Substitution • Enclosure or isolation • Work practices • Training and education • Administrative controls Procedures for reporting and controlling hazards			

	1.3 Define and describe the importance of personal and workplace hygiene	Definition • Hygiene Personal hygiene • Cross-contamination (wash hands) • Attire Workplace hygiene • Personal protective closing • Use of cleaning equipment • Appropriate handling and disposal of garbage • Cleaning and sanitising			
	1.4 Identify different types of personal protective clothing and equipment, their use and storage	Definition • Personal protective equipment and clothing Clothing • Overall • Steel cap boots • High visibility vest • Jacket • Rubber insulated gloves Equipment • Safety goggles • Safety hat • Ear muffs/plugs Use and storage procedure			

	1.5 Identify emergency situations	Definition • Emergency Definition • Evacuation Types of emergencies • Accidents • Fire • Electric shock • Flood • Chemical spill • Earth Quake			
	1.6 Demonstrate procedures for dealing with emergency and evacuation situations	Roles and responsibilities • Safety officer • Supervisor • Worker Emergency & Evacuation procedures			
	1.7 List fire prevention methods	• House keeping • Training Different classes of fire • Class A – wood, paper or cloth • Class B – liquids • Class C – gas • Class E - electrical			

	1.8 Demonstrate use of fire fighting equipment	Types of fire fighting equipment • Fire blanket • Fire extinguisher • Types of fire extinguisher Procedures for using fire fighting equipment			
	1.9 Explain the meaning of safety and electrical signs and symbols	Key features of safety signs and symbols • Shape • Colour • Graphics • Hazard identification • Facility or location signs • Site safety • Directional • Warning signs & symbols • Basic Electric Symbol			

Learning Unit	Learning Outcomes	Learning Elements	Duration (Hours)	Materials Required	Learning Place
LU-2: **Perform bench work** *This learning unit addresses competency standard(s):* *A – A1/3** *C - C1/2/3** *D – D1/2/3/4/5** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	2.1 Identify saw blades for different types of metals and non-metals	Definition • Saw cutting Metals • Cooper; Brass; Steel Non-metals • PVC • Wood	**Total** 130 **Theory** 15 **Practical** 115	• Hacksaw • Saw blades • Holding devices • Tap set • Lubricant for thread cutting • Different hand files • Marking out tools • Measuring tools • Cleaning materials • Labels • Storage facilities • Examples of workplace documentation • Safety signage • Personal protective equipment and clothing • Teaching aids • Flip charts • Computer *(preferably with internet access)*	**Theory** Classroom **Practical** Lab Workshop Local industry
	2.2 Identify types of holding devices	Holding devices • Clamps • Vice • Bench vice • V-blocks • Angle plates			
	2.3 Demonstrate procedures for hand-saw cutting	Hazards: • Cuts • Sharp metal burrs • Noise Procedures for cutting • Saw blade check • Holding device • Push-/Pull stroke Conformance check			
	2.4 Demonstrate marking out procedures	Marking out tools and procedures			

	2.5 Demonstrate thread cutting procedures	Definition Tap set components • Thread cutting • Taps • Dies • Lubricant • Accessories Hazards: • Cuts • Sharp metal burrs • Splinters • Punctures • Flammability of swarf/chips Procedures for thread cutting			
	2.6 Identify different types of files	Definition • Filing Types of file • Hand file • Round file • Half round file • Square file • Three square file Application			

	2.7 Demonstrate filing procedures	Hazards: • Cuts • Sharp metal burrs • Splinters • Punctures Flammability of swarf/chips Marking out tools • Square • Scriber • Divider • Punch • Straight edge Measuring tools • Vernier caliper • Measuring tape • Steel rule Procedures for filing			
	2.8 Demonstrate procedures for cleaning and storing tools and equipment, including waste removal	• Inventory of tools and equipment • Proper storage of tools and equipment • Documentation of maintenance procedures			

	2.9 Demonstrate problem solving procedures related to basic mechanical works	Apply the Bransford IDEAL model (problem solving) • Identify the problem • Define the problem through thinking about it and sorting out the relevant information • Explore solutions through looking at alternatives, brainstorming, and checking out different points of view • Act on strategies • Look back and evaluate the effects of your capacity			

Learning Unit	Learning Outcomes	Learning Elements	Duration (Hours)	Materials Required	Learning Place
LU-3: **Perform installations** *This learning unit addresses competency standard(s):* *A – A1/3** *C - C1/2/3** *H – H1/2/3/4** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	3.1 Identify, obtain and interpret safety and other regulatory requirements	• Safety requirements - Specifications - Hazard identification - PPE	**Total** 90 **Theory** 15 **Practical** 75	• Hand and power tools for installation - Pliers - Side cutter - Wire striper - Screw drivers - Hacksaw - Bench vice - Drill machine • Cleaning materials • Measuring tools • Installation material • Ducts, Conduits • Labels • Storage facilities • Sample workplace documentation • Safety signage • PPE • Teaching aids • Flip charts • Computer *(preferably with internet access)*	**Theory** Classroom **Practical** Lab Workshop Local industry
	3.2 Identify and select the tools and equipment for work	• Types of tools, equipment and material • Auxiliary tools and equipment			
	3.3 Interpret circuit diagrams	Confirm wiring specification • Drawings and symbols • Specifications • Wiring requirements			
	3.4 Demonstrate procedures for installing conduits and/or ducts	• Properties of material - PVC & GI pipes Prepare installation of cables • Chiselling • Ducting			
	3.5 Demonstrate procedures for jointing cables and connections	• Cables and tools • Types of joints - tin, crimped terminals - ferrules & shrinking nut - bolt & screw terminal • Jointing procedures			

	3.6 Demonstrate procedures for final quality inspection	• Importance of quality • Completing documents • Waste disposal procedures • Care of tools and equipment			
	3.7 Demonstrate problem solving procedures related to basic electrical works	Apply the Bransford IDEAL model (problem solving) • Identify the problem • Define the problem through thinking about it and sorting out the relevant information • Explore solutions through looking at alternatives, brainstorming, and checking out different points of view • Act on strategies • Look back and evaluate the effects of your capacity			

Learning Unit	Learning Outcomes	Learning Elements	Duration (Hours)	Materials Required	Learning Place
LU-4: **Perform excavations** *This learning unit addresses competency standard(s):* *A – A1/3** *C - C1/2/3** *I – I1/2/3/4** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	4.1 Identify tools and equipment	Definition • Excavation Tools and equipment • Shovel • Spade • Pick axe • Hammer • Chisel Auxiliary tools and equipment • Pegs • Spirit level • Water level	**Total** 60 **Theory** 10 **Practical** 50	• Hand tools for excavation - Pick axe - Shovel; Spade - Different hammers - Chisel • Cleaning materials • Measuring tools • Materials - timber - nails - pegs - sheet material • Labels • Storage facilities • Examples of workplace documentation • Safety signage • PPE • Teaching aids • Flip charts • Computer *(preferably with internet access)*	**Theory** Classroom **Practical** Lab Workshop Local industry
	4.2 Demonstrate procedures for excavation	Hazards may include: • Collapse • Manual handling • Electrical/Water hazards • Noise Measuring tools and procedures Procedures for excavation • Conformance check			

	4.3 Demonstrate procedures for cleaning and storing tools and equipment, including waste removal	• Inventory of tools and equipment • Proper storage of tools and equipment • Documentation of maintenance procedures			
	4.4 Demonstrate problem solving procedures related to basic excavation works	Apply the Bransford IDEAL model (problem solving) • Identify the problem • Define the problem through thinking about it and sorting out the relevant information • Explore solutions through looking at alternatives, brainstorming, and checking out different points of view • Act on strategies • Look back and evaluate the effects of your capacity			

Learning Unit	Learning Outcomes	Learning Elements	Duration (Hours)	Materials Required	Learning Place
LU-5: **Apply knowledge of work ethics** *This learning unit addresses competency standard(s):* *G – G1/2/3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	5.1 Define the term 'work ethic' 5.2 Describe factors that demonstrate strong work ethic	Definition • Work ethic Work ethic factors • Integrity - Confidentiality • Sense of responsibility - Time management • Emphasis on quality - Commitment to work • Discipline - Patience and tolerance • Sense of teamwork - Meeting goals as a team Customer service Communication Attire Influencing factors,such as: • Anger • Stress • Depression	**Total** 40 **Theory** 20 **Practical** 20	• Teaching aids • Flip charts • Computer *(preferably with internet access)*	• Classroom

Module 2:	**Workplace communication**				
Objective of the Module:	On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • B: Communicate in different work contexts • E: Apply basic reading, writing and speaking skills in English in different life contexts • F: Apply basic numeracy skills in different life contexts				
Duration:	Total: 80 hours	Theory: 20 hours		Practice: 60 hours	
Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration**	**Materials Required**	**Learning Place**
LU-1: **Communicate in the workplace** *This learning unit addresses competency standard(s):* *B – B1/2/3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	1.1 Define technical terms related to succeeding on the job	Terms pertaining to basic work skills in workplace operations	**Total** 20 **Theory** 05 **Practical** 15	• Examples of workplace documentation • Workplace forms • Safety signage • Teaching aids (Flip charts, Computer *(preferably with internet access), etc)*	• Classroom • Workplace
	1.2 List different types of communication	Face to face • Verbal and non verbal Written • Work instructions • Specifications • Safety sheets • Notice boards Visual • Safety signs • Hand signals			
	1.3 Demonstrate receiving and responding to information using different communication types	Electronic • Purpose and function of electronic communication devices, such as: - Two way radio - Phone, Fax, E-mail			

		• Effective face to face communication - Appropriate communication etiquette • Effective written communication - Appropriate communication etiquette • Effective visual communication - Appropriate communication etiquette • Effective electronic communication - Appropriate communication etiquette			

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-2: **Complete work-related documents** *This learning unit addresses competency standard(s):* *B – B4** *E – E1/2/3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	2.1 Assess the need for accurate written directions to complete a task	Interpretation of texts, key words and phrases, in work related documents, such as • Workplace forms • Job cards • Installation guides • Manufacturers' specifications Completion of work related documents • Workplace forms • Job cards	**Total** 40 **Theory** 10 **Practical** 30	• Examples of workplace documentation • Workplace forms • Job cards • Installation guides • Manufacturers' specifications • Technical literature • Safety signage • Teaching aids • Flip charts • Computer *(preferably with internet access)*	• Classroom • Workplace
	2.2 Write a short report in simple English for practical purposes related to MHP operations	Planning • Introduction • Conclusion • Summary Drafting Editing • Spelling • Grammar • Punctuation			
	2.3 Demonstrate understanding from reading a simple text related to the work in MHP operations	Purpose of text Main idea(s) of text Key words and phrases Opinion on text			

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-3: **Apply basic numeracy** *This learning unit addresses competency standard(s):* *F – F1/2/3/4/5** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	3.1 Identify two- and three dimensional shapes	Two or three dimensional shapes may include: • Rectangle • Triangle • Sphere • Cube • Cylinder • Pyramid • Square • Polygons • Circle • Cuboids Use correct terminology, such as: • Horizontal • Vertical • Parallel • Sides • Corners • Edges • Arc • Angles/Degrees • Length/Width/Breadth/ Height	**Total** 20 **Theory** 05 **Practical** 15	• Two- and three dimensional shapes / objects • Measuring instruments, such as rulers, watches / clocks, scales, thermometers, AVO meter, gravity meter • Teaching aids • Flip charts • Computer *(preferably with internet access)*	• Classroom • Workplace

		• Straight • Points • Diameter • Radius Circumference			
	3.2 Sketch in diagrammatic form simple two and three-dimensional shapes and objects	Two or three dimensional objects may include: • Rectangle • Triangle • Cube • Cylinder • Pyramid • Square • Circle • Cuboids			
	3.3 Assemble simple three-dimensional objects by following construction instructions, plans or diagrams	Simple three dimensional objects may include: • Cube • Cylinder • Pyramid • Cuboids			
	3.4 Identify measuring instruments used in mechanical, electrical, civil work operations	Measuring instruments may include: • Rulers, including use • Watches / clocks • Scales			

		• Thermometers • AVO meter • Gravity meter			
	3.5 Calculate area and volume of regular shapes and objects	Simple formulae for calculating area and volume			
	3.6 Demonstrate basic calculation procedures related to money and time, including whole numbers, simple fractions and decimals	Money • Addition/Subtraction • Division • Percentage • Rounding Time • Calculate time lapsed • Summation of time • Appending additional time			
	3.7 Demonstrate knowledge of graphs and tables	Graphs may include: • Simple line & bar graphs Tables may include: • Simple column tables • Tables used in everyday life such as timetables Collect, sort & record data • Preparation of basic data, tables & graphs Construct and label graphs • Increasing/Decreasing • Constant value			

	3.8 Demonstrate use of simple formulae and algebraic expressions	Simple formulae and algebraic expressions may relate to: • Area • Perimeter • Dimensions of regular and irregular shapes Verification may include: • Estimation • Backtracking			

4. Assessment guidance

Competency-based assessment is the process of gathering evidence to confirm the candidate's ability to perform according to specified outcomes articulated in the competency standard(s).

4.1 Types of assessment

a) Sessional assessment

The goal ofsessional assessment is to monitor student progress in order to provide constant feedback. This feedback can be used by the trainers to improve their teaching and by learners to improve their learning.

More specifically, sessional assessments Help learners to identify their strengths and weaknesses and Help trainers to recognise where learners are struggling and address problems immediately

Examples of sessional assessments include:

- Observations
- Presentations
- Activity sheets
- Project work
- Oral questions

b) Summative (final) assessment

The goal of summative (final) assessment is to evaluate learning progress at the end of a training programme by comparing it against, e.g. set of competency standards.

Examples of summative assessments include:

- Direct observation of work activities
- Final project
- Written questions

4.2 Principles of assessment

When conducting assessment or developing assessment tools, trainers/assessors need to ensure that the following principles of assessment are met:

Validity

- Indicates if the assessment outcome is supported by evidence. The assessment outcome is valid if the assessment methods and materials reflect the critical aspects of evidence required by the competency standards (Competency units, performance criteria, knowledge and understanding).

Reliability

- Indicates the level of consistency and accuracy of the assessment outcomes. The assessment is reliable if the assessment outcome will produce the same result for learners with equal competence at different times or places, regardless of the trainer or assessor conducting the assessment.

Flexibility

- Indicates the opportunity for learners to discuss certain aspects of their assessment with their trainer or assessor, such as scheduling the assessment. All learners should be made aware of the purpose of assessment, the assessment criteria, the methods and tools used, and the context and proposed timing of the assessment well in advance. This can be achieved by drawing up a plan for assessment.

Fair assessment

- Fair assessment does not advantage or disadvantage particular learners because of status, race, beliefs, culture and/or gender. This also means that assessment methods may need to be adjusted for learners with disabilities or cultural differences. An assessment should not place unnecessary demands on learners that may prevent them from demonstrating competence.

4.3 Assessment template – Sessional and Summative assessment

Module 1: Workplace introduction

Learning Units	Recommended form of assessment	
	Sessional	**Summative**
LU-1: Maintain health and safety *This learning unit addresses competency standard(s):* *A – A1/2/3/4**	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	<u>Integrated assessment:</u> Practical demonstration/ Project work on: a) Bench work b) Installations c) Excavations The assessment tasks have to include aspects of health and safety, problem solving, work ethics, documentation and numeracy
LU-2: Perform bench work *This learning unit addresses competency standard(s):* *A – A1/3*; C - C1/2/3*; D – D1/2/3/4/5**		
LU-3: Perform installations *This learning unit addresses competency standard(s):* *A – A1/3*; C - C1/2/3*; H – H1/2/3/4**		
LU-4: Perform excavations *This learning unit addresses competency standard(s):* *A – A1/3*; C - C1/2/3*; I – I1/2/3/4**		
LU-5: Apply knowledge of work ethics *This learning unit addresses competency standard(s):* *G – G1/2/3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*		

Module 2: Workplace communication

Learning Units	Recommended form of assessment	
	Sessional	**Summative**
LU-1: Communicate in the workplace *This learning unit addresses competency standard(s):* *B – B1/2/3** **LU-2: Complete work-related documents** *This learning unit addresses competency standard(s):* *B – B4*; E – E1/2/3** **LU-3: Apply basic numeracy** *This learning unit addresses competency standard(s):* *F – F1/2/3/4/5** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Role play Oral and written questions	<u>Integrated assessment:</u> The summative assessment of this module will be integrated in the assessment project(s) of module 1.

5. List of Tools, Machinery & Equipment

Occupational title	Micro Hydel Power Plant operations (Helper) – Level 1	
Duration	**3 months**	
Sr. No.	**Name of Item/ Equipment / Tools**	**Quantity**
	Mechanical	
1.	7 pieces screwdriver set	
2.	Adjustable wrench set	
3.	Allen Keys Set	
4.	Aluminum Spirit Level (leveling instrument)	
5.	Bastard File with wood handle (Flat)	
6.	Bastard File with wood handle (Round)	
7.	Bench Vice	
8.	Bench Workstation	
9.	Chisel	
10.	Clamp Meter	
11.	Claw hammer with wood handle	
12.	Combination Pliers	
13.	Crimping Tool	
14.	Hack Saw with Blades	
15.	Hand Drill [1/8" – 1/8"]	
16.	Hand Grease Gun	
17.	Hand Grinding Machine	

18.	Hot Air Blower	
19.	Measuring tape	
20.	Micro Meter [Screw Gauge]	
21.	Nose Plier	
22.	Oil Can	
23.	Pedestal Drill	
24.	Pen Grinder	
25.	Pipe Wrench [18" & 24"]	
26.	Portable Welding Plant [100 – 300 Amperes]	
27.	Puller	
28.	Punch Set	
29.	Retched Block with Grip	
30.	Screw Driver Set (-)[6"-18"]	
31.	Screw Driver Set (+) [6"-18"]	
32.	Side Cutting Plier	
33.	Spanner Set (Open)	
34.	Spanner Set (Ring)	
35.	Stainless Steel Slogging Ring Spanner	
36.	Thread Gauge	
37.	Tong/Monkey Plier	
38.	Vernier Calliper	
39.	Wheel Grinder	

40.	Wire Gauge	
41.	Welding Plant	
Electrical		
1.	Clamp Meter	
2.	Combination Plier	
3.	Earth Tester	
4.	Line Tester	
5.	Megger	
6.	Multi Meter	
7.	Nose Plier	
8.	Pin Plier	
9.	Screw Driver Set	
10.	Side Cutter	
Safety Tools		
1.	Fire Extinguisher	
2.	First Aid Box	
3.	Hand Gloves	
4.	Hard top Hat	
5.	Mask	
6.	Overall combination [Dress]	
7.	Safety Belt	
8.	Safety Goggles	

9.	Steel Toe Shoes	
EQUIPMENT		
Civil		
1.	Air Vent Pipe	
2.	Bell Mouth	
3.	Control Gates	
4.	Control Valves	
5.	Expansion Joint	
6.	Flanges	
7.	Flushing Gates	
8.	Flushing Pipe	
9.	Penstock	
10.	Reducer	
11.	Rubber Seal	
12.	Trash Rack	
Electrical		
1.	Ballast Tank with Heaters	
2.	Binding wire	
3.	Cable Shoe	
4.	Channel Iron	
5.	Conductors	
6.	D-Iron Set	

7.	Disc Insulator [With Tension Set]	
8.	Earth Wire	
9.	Earthing Plate	
10.	Electrical Panels	
11.	Electronic Load Controller	
12.	Energy Meter	
13.	Generator[Brushed and Brush-less]	
14.	Metal Clad Main Switch	
15.	Pin Insulator	
16.	Pole	
17.	Power Cable	
18.	Pressure Transducer	
19.	Shackle Insulator	
20.	Stay Insulator	
21.	Stay Plate	
22.	Stay Rod	
23.	Stay Wire	
24.	Thimble	
25.	Transformer	
26.	Turn Buckle	
27.	Ultra Sonic Flow Meter	
Mechanical		

1.	Angle Iron [Cross Arm]	
2.	Butterfly Valve	
3.	Coupling [Flexible/Rigid]	
4.	Crossflow Turbine	
5.	Flat Belt	
6.	Flat Pulleys	
7.	Fly Wheel	
8.	Francis Turbine	
9.	Gate Valve	
10.	Gear Box	
11.	Governor	
12.	Hydraulic Jack	
13.	Operating Rod	
14.	Pelton Turbine	
15.	Propeller/Kaplan Turbine	
16.	Single Phase Variac [Auto Transformer]	
17.	Tachometer	
18.	V Belt	
19.	V-Pulleys	

6. List of Consumable Supplies

Occupational title	Micro Hydel Power Plant operations (Helper) – Level 1
Duration	3 months

Sr. No.	Name of Consumable Supplies	Quantity
1.	Notepad	
2.	Ball pens	
3.	Pencils	
4.	Erasers	
5.	Sharpeners	
6.	White board markers in different colours	
7.	Stapler	
8.	Paper punch	
9.	Ruler	
10.	Compass	

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