THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Directorate of Industrial Training

Assessment and Training Package

For a POWERLINES ELECTRICIAN

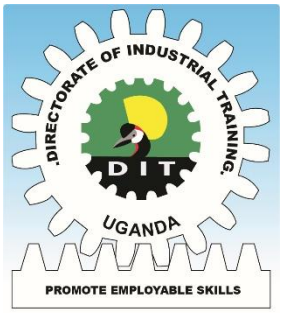
Qualification Level:1

Occupational Cluster: Technology and Design (Electrical)

September2020

Reviewed by
Qualifications Standards Department
Directorate of Industrial Training

Funded by:
Government of Uganda



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Under BTVET Act, 2008, the functions of the Directorate of Industrial Training are:

(a) To identify the needs of the labour market for occupational competencies that fall under the UVQF.
(b) To regulate apprenticeship schemes.
(c) To foster and promote entrepreneurial values and skills, as an integral part of the UVQF.
(d) To secure adequate and sustainable financing for the efficient operations of the Directorate.
(e) To accredit training institutions or companies as assessment centres.
(f) To determine fees payable under the Act.
(g) To develop, apply, expand and improve the purposeful application of Uganda vocational qualifications defined in the UVQF.
(h) To assess and award Uganda Vocational Qualifications.
(i) To promote on-the-job training in industry for apprenticeship, traineeship and indenture training and for other training such as further skills training and upgrading.
(j) To prescribe the procedure for the making of training schemes.

Further to the above provisions, there is an established Uganda Vocational Qualifications Framework (UVQF), under part V of the BTVET Act, 2008. It is stated that:

The purpose of the UVQF is to;
(a) Define occupational standards in the world of work.
(b) Define assessment standards.
(c) Award vocational qualifications of learners who meet the set standards of different studies.
(d) Provide guidelines for modular training.

The UVQF shall follow principles of Competence Based Education and Training (CBET) which include:
(a) Flexible training or learning modules.
(b) Positive assessment and certification.
(c) Assessment of prior learning.
(d) Recognition of formal and non-formal training.
(e) Self-paced or individual learning.
(f) Work place learning.

For award and recognition of certificates, the BTVET Act, 2008 provides that:

(1) The Directorate and other examination boards established under the Act shall award certificates and diplomas for Business, Technical or Vocational Education and Training under the UVQF.

(2) The Certificates and Diplomas to be awarded shall be in the form prescribed by the Minister on the recommendation of the Industrial Training Council.

(3) The Certificates and Diplomas awarded under the Act shall be recognised in the Uganda education system and by the labour market.

Under the TVET Implementation Standards 2020, the proposed new mandate of the Directorate of Industrial Training shall be restricted to promoting the highest standards in the quality and efficiency of industrial training in the country and ensuring an adequate supply of properly trained manpower at all levels in the industry and the world of work.

The functions shall include:

(a) Regulating Industrial Training and Trainers.
(b) Developing Industrial Training Curricula.
(c) Harmonising Curricula and Certificates of competence.
(d) Assessing Industrial Training.
(e) Development of Occupational Standards and Assessment and Training Packages (ATPs) for Trade Testing for the industry and world of work.
(f) Awarding certificates in that respect.

At operational level in the Directorate, the Qualification Standards Department performs development tasks related to concepts, procedures and instruments for establishment of the UVQF in close collaboration with both public and private stakeholders in vocational training.

In particular, the Department organises and coordinates the development of Assessment and Training Packages for use in competence-based vocational training as well as standards-based assessment and certification.

The Directorate has therefore produced this Assessment and Training Package for use in implementing Competence-Based Education and Training mechanisms.

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Word from Permanent Secretary

The Kajubi Report (1989) and the Uganda Government White Paper on Education Review (1992) emphasised that the Uganda Secondary School Education should be vocationalised.

The World Bank Report on education in Uganda 2007 observed that although Uganda was experiencing steady economic growth on one hand, the secondary education curriculum was inadequately addressing the social and economic needs of the country on the other. The Report further noted that it is not the very top academic cadres that contribute most to the growth of the GDP but rather the competent middle level technicians that are flexible and technologically literate that the economy needs in the labour market at all levels.

Correspondingly, the NDP III 2020/21- 2024/5 highlights (i) low labour productivity (ii) high youth unemployment (38%) (iii) low transition rates from training to employment (35%) as some of the key challenges to Human Capital Development in Uganda.

In order to overcome these challenges, NDP III 2020/21- 2024/5, under objective 2 peaks the need to train the learners for the urgently needed skills and mainstream a dual education and training system. This paved way for the development of the lower secondary school vocational curriculum which supports both academic and vocational training.

The afore is in line with the Uganda Vision 2040. Under section 261, it emphasises that learners will be accorded opportunities to excel in the skills areas they are placed into. These will range from sports and cut to technical and vocational training. Hitherto, section 262 clearly states that the entire education system will be changed to emphasise practical skills, attitude and moral values.

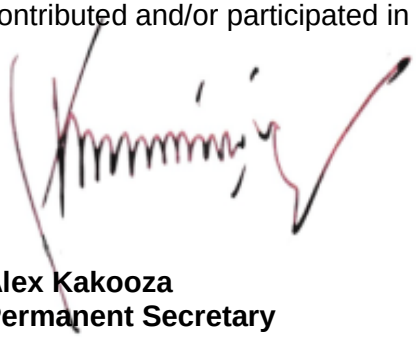
Government of Uganda through the Ministry of Education and Sports rolled out the New Lower Secondary Curriculum in secondary schools countrywide during the first term of the academic year 2020. The overall goal of this curriculum is to produce graduates with employable skills and who are competitive in the labour market. It should be emphasised that vocational training will produce graduates who are employable. In the New curriculum, emphasis will be on equipping learners with employable skills and competencies. This will enable learners perform the requisite duties of the specified occupations. This is the reason why the lower secondary school vocational curriculum was tailored to the assessment requirements of the world of work.

Reading from the Curriculum Framework page 12, it is stated that the learners will be assessed by DIT. Upon assessment and certification, the graduates will be employable and competitive in the labour market. It's against this background that DIT, within its mandate vested in the BTVET Act, 2008 comes on board to take the lead in the development of the requisite Assessment and Training Packages (ATPs) for the various occupations that will be assessed under the Lower Secondary Curriculum.

The ATPs can be used by any training provider and/or those who wish to present themselves for Occupational Assessment and Certification.

Herewith, the Directorate of Industrial Training presents the Assessment and Training Package for training, assessment and certification of a **POWER LINES ELECTRICIAN QUALIFICATION LEVEL 1.**

Finally, I thank all individuals, organisations and review partners who have contributed and/or participated in the review of this noble document.



Alex Kakooza
Permanent Secretary

Executive Summary

This Assessment and Training Package is a Competence-Based Education and Training (CBET) tool and consists of three major parts:

0.1 **PART I: The Occupational Profile (OP) of a POWER LINES ELECTRICIAN.** This Occupational Profile which was reviewed by Power Lines Electricians practicing in the world of work mirrors the duties and tasks that Power Lines Electricians are expected to perform.

0.2 **PART II: Training Modules** in the form of guidelines to train Power Lines Electricians both on the job as well as in training centres (or combinations of both venues of learning). The Training Modules herein have been reviewed basing on the Occupational Profile and hence are directly relevant for employment.

0.3 **PART III: Assessment Instruments** in the form of performance (Practical) and written (theory) test items that can and should be used to assess whether a person complies with the requirements of employment as a POWER LINES ELECTRICIAN. These assessment instruments were reviewed jointly by job practitioners (Power Lines Electricians) and instructors based on the occupational profile and training modules.

0.4 While the Occupational Profile (OP) contained in PART I of this document provides the information on **WHAT a person is expected to do** competently in the world of work, the test items, - including performance criteria- of PART III qualify the **HOW and/or HOW WELL a person must do the job**.

0.5 The modular format of the curriculum (PART II) allows learners to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing flexibility for learners to move directly into an entry level job, go for further modules or advance to higher levels of training. Modular courses allow more learners to access the training system because training centres as well as companies can accommodate more learners in a given period of time.

0.6 In addition to improved access, equity and relevance of BTVET, the UVQF will also enable people who are convinced to have acquired competencies laid down in this ATP through prior training and on-the-job experience to access assessment and certification directly; be it on the basis of a single module, a group of modules or all modules pertaining to the occupation at once. This achievement will facilitate Recognition of Prior Learning (RPL).

0.7 The parts of this Assessment and Training Package were sequentially reviewed as follows:

i Part 1: Occupational Profile: ***August 2020***
ii Part 2: Training Modules: ***August 2020***
iii Part 3: Assessment Instruments (initial bank): ***August 2020***

This ATP (or parts of it) may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

DIT takes responsibility of any shortcomings that might be identified in this publication and welcomes suggestions for effectively addressing the inadequacies. The suggestion can be communicated to DIT through P.O. Box 20050, Kampala or through email uvaf.dit@gmail.com.

Patrick Byakatonda
Ag Director

Acknowledgement

The Qualifications Standards Department of DIT wishes to sincerely acknowledge the valuable contributions to the review of this Assessment and Training Package by the following persons, Institutions and organisations:

- Members of the DIT Industrial Training Council,
- The Director and staff of DIT,
- Ministry of Education and Sports,
- The practitioners from the world of work,
- Teachers of Power Lines Electrician from various Secondary Schools,
- Power Lines Electrician Curriculum Specialists from NCDC,
- Examination Specialists from UNEB,
- The facilitators involved in guiding the review panel in their activities,
- The Government of Uganda for financing the review of this ATP.

Abbreviations and Acronyms

A&C	Assessment and Certification
ATP	Assessment and Training Packages
CBET	Competency Based Education and Training
DIT	Directorate of Industrial Training
ITC	Industrial Training Council
GoU	Government of Uganda
LWA	Learning-Working Assignment
MC	Modular Curriculum
MoES	Ministry of Education and Sports
OP	Occupational Profile
PEX	Practical Exercise
PTI	Performance (Practical) Test Item
QS	Qualification Standards
RPL	Recognition of Prior Learning
TIB	Test Item Bank
TVET	Technical, Vocational, Education and Training
UVQ	Uganda Vocational Qualification
UVQF	Uganda Vocational Qualifications Framework
WTI	Written (Theory) Test Item
PPE	Personnel Protective Equipment

Key Definitions

Assessment Assessment is the means by which evidence is gathered and judged to decide if an individual has met the stipulated assessment standards or not. Testing is a form of formal assessment.

Certification Certification is a formal procedure to issue a certificate (qualification) to an individual that has demonstrated during formal assessment that he/she is competent to perform the tasks specified in the occupational profile.

Competence Integration of skills, knowledge, attitudes, attributes and expertise in doing /performing tasks in the world of work to a set standard.

Competency (Occupational) competence is understood as the ability to perform tasks common to an occupation at an acceptable level.

CBET Competence-based education and training means that programmes:

1. have content directly related to work
2. focus is on 'doing something well'
3. assessment is based upon industry work standards, and
4. curricula are developed in modular form

Duty A Duty describes a large area of work in performance terms. A duty serves as a title for a cluster of related Tasks (see also: TASK).

Learning-Working Assignment (LWA) LWA are simulated or real job situations / assignments that are suitable for learning in a training environment (e.g. "small projects"). In a working environment LWAs are real work situations /assignments.

Modules Modules are part(s) of a whole curriculum. Modules can be considered as "self-contained" partial qualifications which are described by learning outcomes or competencies and which can be assessed and certified individually.

Occupational Profile (OP)

An Occupational Profile is an overview of the duties and tasks a job incumbent is expected to perform competently in employment.

Occupational Profiles developed by practitioners from the world of work enhance the relevance of training and learning to the requirements of the world of work.

Occupational Profiles define what a person is supposed to do in performance terms. It also contains generic information regarding related knowledge and skills, attitudes/behavior, tools, materials and equipment required to perform as well as trends/ concerns in the occupation.

Occupational profiles are the reference points for developing modular curricular and assessment standards.

Qualification

A qualification is a formal recognition for demonstrating competence, based on formal assessment against set standards. A qualification is provided to the individual in form of a certificate specifying the nature of the competence.

Task

Job Tasks represent the smallest unit of job activities with a meaningful outcome. Tasks result in a product, service, or decision. They represent an assignable unit of work and have a definite beginning and ending point. Tasks can be observed and measured. *(Also see: Duty)*

1.0 ATP-PART I

Occupational Profile for a POWER LINES ELECTRICIAN

1.1 The OCCUPATIONAL PROFILE (OP) for "Power Lines Electrician" below defines the ***Duties*** and ***Tasks*** a competent Power Lines Electrician is expected to perform in the world of work (on the job) in Uganda and the East African region today.

1.2 Since it reflects the skill requirements of work life, the Occupational Profile is the reference document for the subsequent development of training modules and assessment instruments (test items) which are directly relevant to employment in Ugandan and the East African businesses and industries.

1.3 To ensure that the Occupational Profile is relevant for employment in Uganda and East Africa, the DIT used the method of "occupational/job profiling.[1]

This approach involves the brainstorming of a panel of 8 to 12 competent job practitioners guided by trained and experienced facilitators. During a two-day workshop the panelists define the duties and tasks performed in employment, as well as the prerequisite skills, knowledge, attitudes, tools and equipment, and the future trends and concerns in the occupation/job.

1.4 The panelists, facilitators and coordinators who participated in developing this Occupational Profile are listed on the following page.

The DACUM-method was used. DACUM is an acronym for Develop a Curriculum

Job Expert Panel

Kyembe Fahadi
Umeme Ltd

Asaanidde Saved
Umeme Ltd

Twikirize Michael
Rural Electrification Agency

Tumwine Francis
Mbarara High School

Mutibwa Francis Emmanuel
Mt. St. Mary'sCollege
Namagunga

Bibino Bernard
Bweranyagi Girls SS

Batya Daniel
Ntare School

Semulimi Moses
Kampala Polytechnic Mengo

Ssekaggya Ishaq kasirye
Kawempe MuslimS.S

Kiwanuka Abdurahuman
Heritage Vocational SS

Co-ordinator
Mukyala Ruth Elizabeth
Directorate of Industrial Training

Facilitators
Aheebwa Joan
Directorate of Industrial Training
Kyatuhire Fortunate
Directorate of Industrial Training

Funded by
The Government of Uganda

THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Directorate of Industrial Training

Occupational Profile

For a

"POWER LINES ELECTRICIAN"

Developed by: Qualifications Standards
Department of Industrial Training

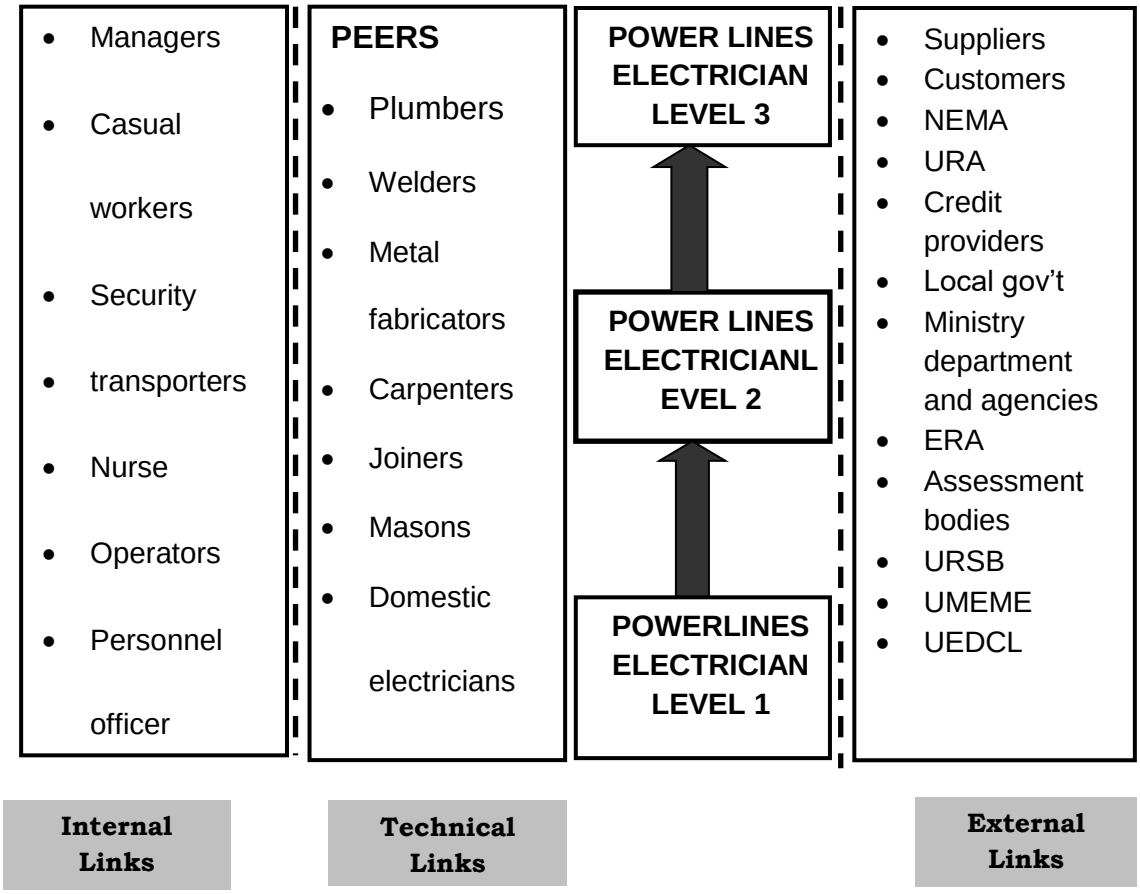
Dates of workshop: 07th-11th September 2020

NOMENCLATURE FOR THE OCCUPATION OF POWER LINE ELECTRICIAN

Definition: A Power Lines Electrician

Is a person who is able to construct, maintain and repair overhead, underground transmission and distribution lines from the power source to the consumer.

JOB ORGANISATION CHART FOR A POWER LINES ELECTRICIAN



1. **UVQF Level I Power Line Electrician:** Is a person who can carry out power line activities up to 240V .
2. **UVQF level II Powerline electrician:** Is a person who carries out activities in the power line system up to 415V.
3. **UVQF Level III Powerline electrician:** Is a person who carries out activities in the power line system and supervises work up to 415V.

Duties and Tasks

A. PLAN WORK	**A1** Select site	**A2** Select tools and equipment	**A3** Identify labour requirements
	A4 Prepare maintenance schedule	**A5** Prepare work schedule	**A6** Obtain material specifications
	A7 Cost work		

B. CONSTRUCT POWER LINES	**B1** Interpret power line survey drawing	**B2** Select poles	**B3** Excavate pits
	B4 Erect poles	**B5** Dress poles	**B6** String and sag conductors
	B7 Fix jumpers	**B8** Lay underground power transmission cables	

C. INSTALL SUBTATION FITTINGS	**C1** Install earth substation fittings	**C2** Install transmission transformers	**C3** Install transmission protective devices
	C4 Install transmission switch gears	**C5** Install distribution switch gears	**C6** Install distribution protective devices
	C7 Install distribution transformer	**C8** Test installed transformers	**C9** Install voltage networks
	C10 Install reactors		

D. MAINTAIN POWER TRANSMISSION SYSTEMS	**D1** Replace damaged poles	**D2** Replace broken insulators	**D3** Fix stays
	D4 Tension sagging conductors	**D5** Maintain distribution transformers	**D6** Maintain underground power transmission cables
	D7 Maintain switch gears	**D8** Maintain underground power transmission cables	**D9** Maintain switch gear

E. OBSERVE HEALTH AND SAFETY PRECAUTIONS	**E1** Apply IEE rules and regulations	**E2** Obtain workers permit	**E3** Wear protective gear
	E4 Display safety signs and barriers	**E5** Assess and mitigate risks	**E6** Clear power line
	E7 Evaluate condition of the poles	**E8** Perform safety earthlings of power lines	**E9** Administer first aid
	E10 Install firefighting equipment	**E11** Store tools and equipment	

F. TEST POWER LINES	**F1** Carryout continuity test	**F2** Carryout circuit test	**F3** Carryout insulation test
	F4 Earth resistance test	**F5** Carry out open circuit test	**F6** Carryout primary injection test
	F7 Make a snag report		

G. PERFORM ADMINISTRATIVE TASKS	**G1** Recruit workers	**G2** Assign workers	**G3** Supervise workers
	G4 Liaise with stakeholders	**G5** Manage finances	**G6** Train work
	G7 Pursue professional development	**G8** Conduct research	**G9** Manage resources
	G10 Keep records	**G11** Orient workers	
H. MARKET POWERLINES WORKS	**H1** Brand power lines enterprise	**H2** Advertise power line works	**H3** Network with stake holders
	H4 Sale power services	**H5** Communicate with stake holders	**H6** Offer discounts
	H7 Price power lines services		

Additional Information

Generic Knowledge and Skills

1. Dangers of electricity
2. Constructing power lines
3. Voltage variations
4. Planning skills
5. Ability to select poles
6. power line maintenance
7. Ability to climb poles
8. Types of poles
9. proper tools
10. Innovative skills
11. Knowledge of materials and their proper usage
12. Knowledge of protecting tools and equipment
13. Knowledge of installing switch gears and protective devices
14. Selection of tools and equipment's
15. Measuring instruments
16. Knowledge about safety precautions
17. Customer service skills
18. Life of equipment
19. Trouble shooting
20. Different power line systems
21. Stake holders
22. Hand held tools
23. Rules and regulations
24. Flow of power supply
25. Schematic drawing
26. Background knowledge

Tools, Equipment and Materials

1. Spade
2. Crow bar
3. Augers
4. Bow saw
5. Spanner
6. Tape measure
7. Skid board
8. hammer
9. Hammer
10. Hark saw
11. Bolt cutter
12. Electrician knife
13. Axe
14. Hoe
15. Pike axe
16. Pool lift
17. Tougher
18. Timing belt
19. Wire cutter
20. Fall restriction device
21. Helmet
22. Safety gloves
23. Portable working Earth
24. Safety Boots
32. Ladder
33. Climbing irons
34. Pole pike
35. Bond sling
36. Spirit level
37. Plumb bob
38. Working earth
39. Operating stick
40. Sighting rods
41. Panga
42. Snatch block
43. Roller
44. Power sow
45. Twisting device
46. Bolt cutter
47. Climbing machine
48. Come along tool
49. Nails
50. Insulators
51. Poles
52. Pool cuts
53. Socket thimble
54. Pig tail hook
55. Pole top Meter box
56. Ropes and Threads

25. Mechanical widget
26. Face shield
27. Hack saw
28. Screw driver set
29. Spanner kit
30. Pipe wrench
31. Tension Meter
57. Stay rods
58. Stub
59. Insulating piercing conductor
60. Pole saver

Attitudes/ Traits/ Behavior

1. Honest and transparent
2. Tolerant
3. Hardworking
4. Punctual
5. Realistic
6. Social
7. Able to predict
8. Organised
9. Respectful
10. Confident
11. Team spirit/cooperative
12. friendly
13. Teachable sprit
14. Tolerant
15. Hard working
16. Careful
17. Disciplined
18. Bravery
19. Honesty
20. Physically strong
21. Committed
22. Principles.
23. Open minded
24. Diligence
25. Integrity
26. Dedicated
27. Team player
28. Disciplined
29. Enthusiastic
30. Creative and innovative
31. Resourceful
32. A good listener
33. Result oriented
34. Trainable
35. Strategic
36. Committed
37. Practical
38. Resilient

Future Trends and Concerns

1. No site meetings
2. Vulgar communication among workers
3. Power thefts
4. Poor follow
5. Delayed implementation
6. High perseverance rate
7. Poor equipment on market
8. Impastation
9. No risk assessment books
10. Under payment
11. Poor communication
12. No work registers
13. Lines manship should be recognised profession
14. Lines are under paid
15. Lines manship is considered to be for the un educated people
16. Poor follow up and delayed implementation
17. Missing link between industry and training
18. High levels of safety risk

2.0 ATP – PART II

Training Modules for a POWERLINES ELECTRICIAN

2.1 A curriculum is a "guide /plan for teaching and learning" which provides a guide to teachers, instructors and learners. In the envisaged system of competence-based or outcome-oriented education and training (CBET), Curricula are no longer the benchmark against which assessment is conducted. It is rather the Occupational Profile that provides the benchmark for Curriculum development as well as assessment.

2.2 This modular format of the curriculum allows learners of POWERLINE ELECTRICIAN to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing learners to move directly into an entry level job, do further modules and advance to higher levels of training. Modular courses allow more learners to access the training system because training centres, as well as companies can accommodate more learners in a given period of time.

2.3 The modules were reviewed jointly by both instructors and job practitioners. They were reviewed using the Occupational Profile as a reference point and taking into account the specifications of training and learning outcomes.

2.4 The modules contain "Learning-Working Assignments" (LWAs) and related "Practical Exercises" (PEXs) as key elements.

LWAs are simulated or real job situations/assignments that are suitable for learning in a training environment (e.g. "small projects").In a working environment, LWAs are real work situations.

PEXs are therefore sub-sets of a LWA.

2.5 In principle, and following the philosophy of Competence-Based Education and Training (CBET), the modules can be used as a guide for learning in training Centre, at the workplace; or a combination of both.

WHO IS APOWERLINES ELECTRICIAN- QUALIFICATION LEVEL 1

A Power Lines Electrician is a person who can carry out power lines activities up to 240v.

TRAINING MODULES FOR A POWER LINES ELECTRICIAN UVQ LEVEL 1

Code	Module Title	Average duration	
		Contact hours	Weeks
UE/PLE/M1.1	Develop Electrical Drawing	120	2
UE/PLE/M1.2	Construct Single Phase Low Voltage power lines	720	12
UE/PLE/M1.3	Maintain Single Phase, Low Voltage Overhead Power Line	240	4
UE/PLE/M1.4	Maintenance of Single Phase Low Voltage Underground Cables	240	4
UE/PLE/M1.5	Establish a Power Lines Enterprise	240	4
Summary	**5 Training Modules**	**1560 hours**	**26weeks**

Note: Average duration is contact time but NOT calendar duration

It is assumed that:

- 1 day is equivalent to 8 hours of nominal learning and
- 1 month is equivalent to 160hours of nominal learning

Information given on the average duration of training should be understood as a guideline. Quick learners may needless time than indicated or vice versa

At completion of a module, the learner should be able to satisfactorily perform the included Learning Working Assignments, their Practical exercises and attached theoretical instructions, as the minimum exposure.

Prior to summative assessment by recognized Agencies, the users of these Modules Guides are encouraged to carefully consider continuous assessment using samples of (or similar) performance (practical) and written test items available in part 3 of this ATP.

TRAINING MODULES FOR A POWER LINES ELECTRICIAN

Code	**UE/PLE/M1.1**
Module title	**M1.1: Develop Electrical Drawing**
Related Qualification	Part of Uganda Vocational Qualification (Power line electrician UVQ 1)
Qualification Level	1
Module purpose	By the end of this module, a trainee shall be able to sketch, draw and interpret electrical drawings
Learning-Working Assignments (LWAs)	**LWA 1/1: Sketch and Draw Electrical Drawings** **LWA 1/2: Interpret Electrical Drawings** **LWA 1/3: Perform Occupational Health Safety and Environmental Protection Practices** ***Note:*** *1. The learning exercises may be repeated until the trainee acquires targeted competence* *2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning assignment*
Related Practical Exercises (PEXs)	**LWA 1/1: Sketch and Draw Electrical Drawings** PEX 1.1: Sketch electrical drawings and wirings PEX 1.2: Draw electrical symbols PEX 1.3: Draw block diagrams PEX 1.4: Draw Line diagrams
	LWA 1.2 Interpret Electrical Drawing PEX 2.1. Interpret line drawings PEX 2.2. Interpret block drawing PEX 2.3. Interpret systematic circuit diagrams PEX 2.4. Survey profiles PEX 2.5. Interpret structural drawings PEX 2.6. Interpret electrical symbols
	LWA 1/3: Practice Occupational Health Safety and Environmental Protection Practices PEX 3.1: Wear protective gear PEX 3.2: Manage waste PEX 3.3: Practice safe use of tools and equipment PEX 3.4: Sensitise workers on health issues

	PEX 3.5: Administer first aid
Occupational health and safety	Precautions, rules and regulations on occupational health safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • Knowledge on power generation • List types of electrical signs and symbols • List types of electrical lines diagrams • Have an overview of a power line network • Explain general knowledge of algebra, arithmetic, trigonometry, geometric progression series • General knowledge of single phase and three phase circuits • General knowledge of basic of direct current and alternating voltage and current • General knowledge of electrical materials to be used for construction, conducting, resistive, insulating, magnetic materials
Average duration of learning	240hours (15 days) of nominal learning suggested to include: • *5days of occupational theory and* • *10 days of occupational practice*
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training center or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to the established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or	Multi- metre, thermometer, rheostat (variable resisters) switch, power supply units, series and parallel connections, IEE regulation book, drawing

equivalent	instruments (kit) safety operation regulations, heating element.
Minimum required materials and consumables/ equivalent	conductors, resistors, iron fillings wire, compass, needles, magnet (simple bar magnets)
Special notes	

Code	**UE/PLE/M1.2**
Module title	**M1.2: Construct Single Phase, Low Voltage Power Line**
Related Qualification	Part of Uganda Vocational Qualification (Power line electrician UVQ 1)
Qualification Level	1
Module purpose	By the end of this module, a trainee shall be able to construct and install overhead conductors and underground cables carrying up to 240v
Learning-Working Assignments (LWAs)	**LWA 2/1: Erect Structures** **LWA 2/2: Install Overhead Conductors** **LWA 2/3: Install Underground Cables** **LWA 2/4: Perform Occupational Health Safety and Environmental Protection Practices** **Note:** *1. The learning exercises may be repeated until the trainee acquires targeted competence.* *2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning assignment.*
Related Practical Exercises (PEXs)	**LWA 2/1: Erect Structures** PEX 1.1: Interpret survey drawing PEX 1.2: Select tools equipment and materials PEX 1.3: Excavate pit PEX 1.4: Erect poles
	LWA 2/2: Install Overhead Conductors PEX 2.1: Select tools, equipment and materials PEX 2.2: Climb poles PEX 2.3: Dress poles PEX 2.4: Low conductors PEX 2.5: String conductors PEX 2.6: Sag conductors PEX 2.7: Bind conductors PEX 2.8: Fix jumpers PEX 2.9: Install consumer units

	LWA 2/3: Install Underground Cables PEX 3.1. Interpret survey drawing, PEX 3.2. Select poles, equipment and materials PEX 3.3. Excavate pits PEX 3.4. Lay cables PEX 3.5. Terminate cables PEX 3.6. Earth cables PEX 3.7. Install consumer units PEX 3.8. Back fill trench
	LWA 2/3: Practice occupational Health Safety and Environmental Protection Practices LWA 3.1: Wear protective equipment LWA 3.2: Carry out risk assessment LWA 3.4: Display safety signs LWA 3.4: Barricade work area LWA 3.5: Carry out firefighting LWA 3.6: Administer first aid LWA 3.7: Practice safe use of tools and equipment LWA 3.8: Store tools and equipment
Occupational health and safety	Precautions, rules and regulations on occupational health safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • IEE regulation on safety and health practices • Types of first – aid practices • Types of sanitation facilities • Personal hygiene practices • Knowledge about hand/portable tools • Knowledge in digital survey drawing materials • Wastes disposal management • Knowledge of interpreting symbols, signs and drawing

	• Types and sizes of pits dug for power structures • Terminate process of stay wire and conductors • Types of cables & Methods of binding • Knowledge about insulation resistance • Knowledge about earthing
Average duration of learning	720hours (90 days) of nominal learning suggested to include: • *30 days of occupational theory and* • *60 days of occupational practice*
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training center or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to the established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	fire extinguisher, dust bins, pangas, axes, bow saw, ladders, climbers, safety belts
Minimum required materials and consumables/ equivalent	conductors, cross arms, pole savers bolts danger plates
Special notes	

Code	UE/PLE/M1.3
Module title	**M1.3**: **Maintain Single Phase Low Voltage Overhead Power Line**
Related Qualification	Part of Uganda Vocational Qualification (Powerline electrician UVQ 1)
Qualification Level	1
Module purpose	By the end of this module, the trainee shall be able to perform both preventive and corrective maintenance on electrical overhead power lines of up to 240v
Learning-Working Assignments (LWAs)	**LWA 3.1**: **Carryout Preventive Maintenance on Electrical Overhead Power Lines** **LWA 3.2: Carryout Corrective Maintenance on Electrical Overhead Power Lines** **LWA 3.3: Perform Occupational Health, Safety and Environmental Protection Practices** ***Note:*** 1. *The learning exercises may be repeated until the trainee acquires targeted competence.* 2. *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform* each learning assignment
Related Practical Exercises (PEXs)	**LWA 3.1: Carryout Preventive Maintenance on Electrical Overhead Power Lines** PEX 1.1. Perform power line clearance PEX 1.2. Carryout routine inspection the power line PEX 1.3. Re-sag conductors PEX 1.4. Clean and separate oxidised parts of the line conductor PEX 1.5. Tighten loose jumpers PEX 1.6. Replace damaged poles and worn-out poles PEX 1.7. Replace worn-out insulators PEX 1.8. Check effectiveness of earthing
	LWA 3.2: Carryout corrective maintenance on Electrical Power Line PEX 2.1. Replace broken conductors PEX 2.2. Replace broken poles PEX 2.3. Replace damaged insulators PEX 2.4. Replace blown fuses PEX 2.5. Joint broken conductors and jumpers

	PEX 2.6. Replace burnt circuit breakers PEX 2.7. Replace burnt wirings PEX 2.8. Improve earthing
	LWA 3/3: Practice Occupational Health Safety and Environmental Protection Practices PEX 3.1: Wear protective gear PEX 3.2: Observe effective earthing PEX 3.3: Demarcate work area PEX 3.4: Display safety signs PEX 3.5: Label electrical circuits PEX 3.6: Use protective gears PEX 3.7: Practice firefighting PEX 3.8: Administer first aid PEX 3.9: Sensitise workers on key health issue
Occupational health and safety	Precautions, rules and regulations on occupational health safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • IEE regulation on safety and health practice • Knowledge on occurrence of industrial accidents and their prevention. • Explain safety signs and symbols • Types of first – aid practices • Types of sanitation facilities • Personal hygiene practices • Knowledge about hand/portable tools • Knowledge in digital survey drawing materials used • Safety advises of various machine tools • Safety working tools. • Wastes disposal management • Knowledge of interpreting symbols, signs and drawing • Types and sizes of pits dug for power structures • Terminate process of stay wire and conductors • Types of cables • Methods of binding

	• Knowledge about insulation resistance • Knowledge about earthing
Average duration of learning	240hours (15 days) of nominal learning suggested to include: • *5 days of occupational theory and* • *10 days of occupational practice*
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training center or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to the established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	safety belts, soldering gun, screw drivers, multi- meter, pair of pliers, side cuter, washing brush, tester
Minimum required materials and consumables/ equivalent	conductors, cross arms, pole savers, bolts, danger plates, solder wires, soap/ detergents, lubricants, water, towel/ cotton waste, buckets/ basin, ferrules
Special notes	Emphasis should be put on observing safety regulations

Code	UE/PLE/M1.4
Module title	**M1.4**: **Maintain Single Phase Low Voltage Underground Cables**
Related Qualification	Part of Uganda Vocational Qualification (Powerline electrician UVQ 1)
Qualification Level	1
Module purpose	By the end of this module, the trainee shall be able to perform both preventive and corrective maintenance of underground cables and accessories of single phase low voltage.
Learning-Working Assignments (LWAs)	**LWA 4/1: Carryout Preventive Maintenance on Underground Cables of Single Phase** **LWA 4/2: Carryout Corrective Maintenance on Underground Cables of Single Phase** **LWA 4/3: Perform Occupational Health, Safety and Environmental Protection Practices** ***Note:*** 1. *The learning exercises may be repeated until the trainee acquires targeted competence* 2. *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning assignment*
Related Practical Exercises (PEXs)	**LWA 4/1: Carryout Preventive Maintenance on Underground Cables of Single Phase** PEX 1.1: Carryout tests on single phase cables PEX 1.2: Carryout routine inspection on single phase cable terminals PEX 1.3: Replace worn out meters
	LWA 4/2: Carryout Corrective Maintenance on Underground Cables of Single Phase PEX 2.1: Replace burnt single underground cable lugs PEX 2.2: Make fresh joints on single phase cables PEX 2.3: Upgrades single phase cables PEX 2.4: Replace burnt meters PEX 2.5: Replace burnt protective gears PEX 2.6: Clean and separate oxidised parts of power cables PEX 2.7: Replace wornout boots

	LWA 4/3: Perform Occupational Health, Safety and Environmental Protection Practices PEX 3.1: Wear protective gear PEX 3.1: Observe effective earthing PEX 3.2: Demarcate work area PEX 3.3: Display safety signs PEX 3.4: Label electrical circuits PEX 3.5: Use protective gears PEX 3.6: Practice firefighting PEX 3.7: Administer first aid PEX 3.8: Sensitise workers on key health issue
Occupational health and safety	Precautions, rules and regulations on occupational health safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
Pre-requisite modules	None
Related knowledge/ theory	For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case related knowledge/ theory may be obtained from various recognised reference materials as appropriate:
Average duration of learning	240hours (15 days) of nominal learning suggested to include: • *5 days of occupational theory and* • *10 days of occupational practice*
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training center or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to the established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	safety belts, soldering gun, screw drivers, multi- meter, pair of pliers, side cuter, washing brush, tester
Minimum required materials and consumables/ equivalent	conductors, carms, pole savers, bolts, danger plates, solder wires, soap/ detergents, lubricants, water, towel/ cotton waste, buckets/ basin, ferrules
Special notes	Emphasis should be put on observing safety regulations

Code	UE/PLE/M1.5
Module title	**M1.5**: **Establish a Power Lines Enterprise**
Related Qualification	Part of Uganda Vocational Qualification (Powerline electrician UVQ 1)
Qualification Level	1
Module purpose	By the end of this module, a trainee shall be able to market and perform entrepreneurial tasks of a power line electrician
Learning-Working Assignments (LWAs)	**LWA 5/1: Plan a Power Line enterprise** **LWA 5/2: Market Power Line Works** **LWA 5/3: Perform Administrative Tasks** **LWA 5/4: Perform Occupational Health, Safety and Environmental Protection Practices** ***Note:*** *1. The learning exercises may be repeated until the trainee acquire targeted competence* *2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning assignment*
Related Practical Exercises (PEXs)	**LWA 5/1: Plan a Power Line Enterprise** PEX 1.1: Select site PEX 1.2: Market research PEX 1.3: Identify labour requirement PEX 1.4: Source capital PEX 1.5: Participate in financial pears PEX 1.6: Setting up the enterprise
	LWA 5/2: Market Power Line Works PEX 2.1. Advertise Power line works PEX 2.2. Network with stake holders PEX 2.3. Participate in electrical sales PEX 2.4. Communication with stake holders PEX 2.5. Offer after sale services PEX 2.6. Offer discounts
	LWA 5/3: Perform Administrative Tasks PEX 3.1. Keep records PEX 3.2. Manage resources PEX 3.3. Assign duties PEX 3.4. Prepare work schedule PEX 3.5. Remunerate workers PEX 3.6. Motivate workers

	PEX 3.7. Orient workers PEX 3.8. Make consultations PEX 3.9. Prepare a budget
	LWA 5/6: Perform Occupational Health and Safety and Environmental Protection Practices PEX 6.1: Insure workers PEX 6.2: Insure the business PEX 6.2: Wear protective gears PEX 6.3: Train workers on key safety measures PEX 6.4: Sensitise workers on key safety measures PEX 6.5: Engage in cooperate social responsibilities
Occupational health and safety	Precautions, rules and regulations on occupational health safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case related knowledge/ theory may be obtained from various recognised reference materials as appropriate*: • Types of records used by electrician • Definition of the different types of documents used by electricians • Methods of marketing electrical services • Explaining marketing • Definition of information, communication, and technology. • Benefits of communication and technology Methods of storing tools, equipment and materials used by electricians.
Average duration of learning	240hours (15 days) of nominal learning suggested to include: • *5 days of occupational theory and* • *10 days of occupational practice*
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training center or its equivalent provided all equipment and materials required for training are in place.

Assessment	Assessment to be conducted according to the established regulations by a recognised assessment body using related practical and written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	GPS machine, computer, printer, calculator, telephone, mobile phone, electrical tools, and equipment
Minimum required materials and consumables/equivalent	charts, markers, manilas, pens, pencils, reference text books,
Special notes	Emphasis should be put on observing safety regulations

3.0 ATP- PART III

Assessment Instruments for a Power Lines Electrician

3.1 Assessment of occupational competence is the procedure by which evidence is gathered and judged to decide if an individual (candidate) has met the stipulated assessment standards.

3.2 Assessment of occupational competence should comprise of both practical (performance) testing and written (theory/knowledge) testing.

3.3 Based on the Occupational Profile and Training Modules, a combined panel of job practitioners and Instructors reviewed a substantial number of test items for assessing (practical) performance as well as items for assessing occupational knowledge (theory) all stored in an electronic Test Item Bank (TIB) at the Directorate of Industrial Training.

3.4 Performance (Practical)Test Items (PTI)are closely related to typical work situations in Ugandan business enterprises. They comprise of a test assignment for candidates and assessment criteria and/or scoring guides for assessors' use.

3.5 Written Test items (WTI) for written testing of occupational theory, (knowledge) are presented in different forms which include:

- Short answer test items.
- Multiple choice test items
- Matching test items,

These WTIs herein focus on functional understanding as well as trouble-shooting typically synonymous with the world of work.

3.6 Composition of assessment/test papers will always require good choices of different types of WTI in order to ensure the assessment of relevant occupational knowledge required of candidates to exhibit competence.

3.7 The test items contained in the Test Item Bank may be used for continuous/formative assessment during the process of training as well as for summative assessment of candidates who have acquired their competences non-formally or informally.

3.8 In this document, samples of test items for assessing both performance (practical) and occupational knowledge (theory) of a **POWER LINE ELECTRICIAN** are included:

3.9 Overview of Test Item Samples Included

No	Type of test Items	Numbers included
1.	Written (Theory)- (short answer)	2
2.	Written (Theory)- multiple choice	2
3.	Written (Theory)- matching- generic	2
4.	Written (Theory)- matching – cause effect	2
5.	Written (Theory)- matching- work sequence	2
6.	Performance (Practical) test item	1
Total		**11**

WRITTEN TEST ITEMS

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 1
Occupational Title:	Power Lines Electrician
Competence level:	1
Code no.	
Test Item type:	Short answer: √ Multiple choice: Matching item: Generic / Cause-Effect / Work-sequence
Complexity level:	C2
Date of OP:	September 2020
Related module:	M1.3
Time allocation:	2 minutes

Test item	State any two components that are replaced during corrective maintenance of a power line.
Answer space	(i) …… (ii) ……
Expected key (answers)	(i) Replace broken conductors (ii) Replace broken poles (iii) Replace blown fuses (iv) Replace broken insulators

<table>
<tr><td>DIT/ QS</td><td colspan="4">Test Item Database
Written (Theory) Test Item- no. 2</td></tr>
<tr><td>Occupational Title:</td><td colspan="4">Power Lines Electrician</td></tr>
<tr><td>Competence level:</td><td colspan="4">1</td></tr>
<tr><td>Code no.</td><td colspan="4"></td></tr>
<tr><td>Test Item type:</td><td colspan="4"><table>
<tr><td>Short answer</td><td colspan="3">√</td></tr>
<tr><td>Multiple choice</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Matching item</td><td>Generic</td><td>Cause- Effect</td><td>Work-sequence</td></tr>
<tr><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Complexity level:</td><td colspan="4">C2</td></tr>
<tr><td>Date of OP:</td><td colspan="4">September 2020</td></tr>
<tr><td>Related module:</td><td colspan="4">M1.2</td></tr>
<tr><td>Time allocation:</td><td colspan="4">2 minutes</td></tr>
</table>

Test Item	List any two reasons for earthing a power line
Answer spaces	(i) …… (ii) ……
Expected Key (answer)	(i) To maintain the potential differences between earth and neutral at zero (ii) To minimise electric shocks (iii) To allow bond to the earth

DIT/ QS	Test Item Database Written (Theory) Test Item- no.3
Occupational Title:	Power Lines Electrician
Competence level:	1
Code no.	
Test Item type:	Short answer:
	Multiple choice: √
	Matching item: Generic / Cause- Effect / Work-sequence
Complexity level:	C1
Date of OP:	September 2020
Related module:	
Time allocation:	1 minute

Test Item	Which of the following insulators is used in single phase low voltage power line conductors?
Destructors and correct answer	A. Reel B. Post C. Stay D. Pin

Key (answer)	A

DIT/ QS	Test Item Database Written (Theory) Test Item- no.4
Occupational Title:	Power Lines Electrician
Competence level:	1
Code no.	
Test Item type:	Short answer:
	Multiple choice: √
	Matching item: Generic / Cause- Effect / Work-sequence
Complexity level:	C3
Date of OP:	September 2020
Related module:	M 1.2
Time allocation:	1 minute

Test Item	Is a circuit having resistance of 4 ohms causes a voltage drop of 20 volts. Power dissipated in the circuit is?
Distractors and correct answers	A. 80 watts B. 100 watts C. 5 watts D. 320 watts

Key (answer)	B

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 5			
Occupational Title:	Power LinesElectrician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work-sequence
		√		
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M 1.2, M 1.3			
Time allocation:	4 minutes			

Test Item	Match the following formulae to the given terms as used in electrical principals

	TERM
1	Voltage
2	Resistance
3	Current
4	Power
5	Energy

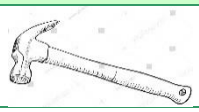
	FORMULAE
A	R= V/I
B	I = V/R
C	V =IR
D	$P = IR^2$
E	E = VIT
F	P =VI

Key (answer)	1:C,2:A,3:B,4:F,5:E,

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 6			
Occupational Title:	Power Lines Electrician			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work-sequence
		√		
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M 1.1,M1.2, M 1.3, M 1.4, M1.5			
Time allocation:	4 minutes			

Test Item	Match the following names to the tools they represent according to the regulations BS3939?

Names	
A	Spanners
B	Ladder
C	Screw driver
D	Multi-meter
E	Hammer

Tools	
1	
2	
3	
4	
	

Key (answer)	A:3, B:4, C:5, D:2, E:1

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 7
Occupational Title:	Power Lines Electrician
Competence level:	Level 1
Code no.	
Test Item type:	Short answer Multiple choice Matching item: Generic / Cause- Effect / Work-sequence — Cause- Effect: √
Complexity level:	C2
Date of OP:	September 2020
Related module:	M 1.3 ,M1.4
Time allocation:	4 minutes

Test Item	Match the following faults to their causes

Faults	
1	Open
2	Short circuit
3	Intermittent supply
4	Earthing

Causes	
A	Live conductor in contact to ground
B	Heavy rain
C	Broken conductor
D	Conductor
E	High temperature

Key (answer)	1:C,2:D,3:E,4:A

DIT/ QS	Test Item Database Written (Theory) Test Item- no.8
Occupational Title:	Power LinesElectrician
Competence level:	Level 1
Code no.	
Test Item type:	Short answer Multiple choice Matching item: Generic / Cause- Effect / Work-sequence ( ) / (√) / ( )
Complexity level:	C2
Date of OP:	September 2020
Related module:	M1.3, M1.4
Time allocation:	4 minutes

Test Item	Match the following effects with their causes while working on a power line.

	Effect
1	Fall downs
2	Shakes
3	Body injuries
4	Traffic accidents

	Causes
A	Improper use of safety gears
B	Working alongside the road
C	Use of blunt climbing irons
D	Contact with live current
E	Poor earthing
E	Absence of barricades and working signs

Key (answer)	1:C,2:D,3:A,4:F

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 9			
Occupational Title:	Power Lines Electrician			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
				√
Complexity level:	C3			
Date of OP:	September 2020			
Related module:	M1.2, M1.3			
Time allocation:	10 minutes			

Test Item	Re-arrange the following to give the correct order of installing overhead conductors

Column A (chronology)	**Column B (work steps) in wrong chronological order**	
1st	A	Sag conductors
2nd	B	Lay conductors
3rd	C	Fix jumpers
4th	D	Bind conductors
5th	E	String conductors
6th	F	Climb pole
7th	G	Dress pole

Expected key (answers)	1-F; 2-G; 3-E; 4-B; 5-A; 6-D,7-C

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 10			
Occupational Title:	Power Line Electrician			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
				√
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.2			
Time allocation:	5 minutes			

Test Item	Give the correct sequence of dressing a pole

Column A (chronology)	**Column B (work steps) in wrong chronological order**	
1st	A	Fix earth wire on the pole
2nd	B	Drill holes on the pole
3rd	C	Position pole
4th	D	Fix pole cup
5th	E	Fix stay wire
6th	F	Turn poles to drilling position
7th	G	Fix danger plate.

Expected key (answers)	1-C; 2-F; 3-B; 4-A; 5-E; 6-D,7-G

PERFORMANCE TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Performance Test Item- no.11
Occupational Title:	Power Lines Electrician
Competence level:	1
Code no.	
Test Item:	Replace a broken intermediate insulator on a 240v single phase power line
Complexity level:	P 3
Date of OP:	September 2020
Related Module:	M1.3
Related skills and knowledge:	• Electrical power equipment's • Measurements with low voltage current electrical Applications • Knowledge on corrective maintenance • Knowledge on safety precautions • Knowledge on voltage levels • Knowledge of operating regulations
Required tools, materials and equipment:	testers, multimeter, operating stick, spanners, pliers, safety belt, protective wear, climbing iron
Time allocation:	4 hours
Preferred venue:	Power line in the Field
Remarks for candidates	❖ Avail protective wear ❖ Observe health, safety and environmental precautions
Remarks for assessors	❖ Provide the tools, equipment and materials listed above

#	Assessment criteria	Scoring guide	Max. Score	
			Process	Result
1	Preparation for task	Wore protective gear Overall Gum boots Head gear Hand gloves		4
		Assembled tools and equipment's		2
		Assembled materials		2
2	Observed safety	Discounted power	2	
		Visible open gap observed		4
		Drove earth electrodes in the earth	2	
		Firmly placed electrodes observed		2
		Connected earth lead to earth electrode	2	
		Firmly connected earth lead observed		2
		Hooked earth wire on neutral conductor first then clamped on the live conductor	3	
3	Climbing the pole	Checked pole	1	
		Put on climbing equipment	2	
		Climbed pole	3	
		Balanced climbing observed		4
		Positioned self	3	
		Adjusted belt firmly fitting around the waist		3
		No tension observed		2
4	Dismantle broken insulators	Unfasten binding wire from one end	2	
		No damage observed on the binding wire		2

#	Assessment criteria	Scoring guide	Max. Score	
			Process	Result
		Completely opened bolts of the insulator	2	
		No damage observed on the bolts		2
5	Replace broken insulator	Rough or white marked side of the insulator faces the pole	4	
		Firmly tightened insulator observed		2
		No cracks on the insulator observed		4
		Wire bound tightly and uniformly		4
5	Descending pole	No tools left on the pole		3
		Adjusted the belt	3	
		Descended pole	2	
		Moved downwards diagonally		3
6	Remove working earth and switched on power	Un hooked working earth using operating stick starting from up down wards	2	
		Use of an operating stick starting from up down wards observed		3
		Restored power	2	
		No visible gap observed		3
	TOTAL		**35**	**51**

4.0 ATP- PART IV

INFORMATION ON REVIEW PROCESS

4.1 Occupational Profile Review (September 2020)

The Occupational Profile was exclusively reviewed by job practitioners who were working in the Power line occupation. The job expert panel, guided by UVQF Facilitators defined duties and tasks performed and provided additional generic information regarding the occupation.

4.2 Training Module Review (September 2020)

Based on the Occupational Profile for Power Lines Electrician of September 2020, Training Modules were reviewed by job practitioners, guided by UVQF Facilitators.

4.3 Test Item Review (September 2020)

Based on the Occupational Profile for Power Lines Electrician of September 2020 and Training Modules, Test Items were reviewed by combined panels of instructors and job practitioners, guided by UVQF Facilitators.

4.4 Methodology

The rationale for the Assessment and Training Package review was to link Vocational Education and Training to the real world of work by bridging Occupational Standards to Training Standards through industry-led Standards-Based Assessment.

Active participation of both instructors and job practitioners' panels consolidated the development philosophy.

The panelists worked as teams in workshop settings complemented by off-workshop field research and literature review activities including international benchmarking.

4.5 Review Panels

The participating panels of Job Practitioners required at different stages were constituted by members from the following organisations:

	Review panel	
	Name	**Institution/ Organisation**
1.	Kyembe Fahadi	Umeme Ltd
2.	Asaanidde Saved	Umeme Ltd
3.	Bibino Bernard	Bweranyagi Girls SS
4.	Batya Daniel	Ntare school
5.	Tumwine Francis	Mbarara High School
6.	Micheal Twikirize	Rural Electrification Agency
7.	Mutibwa Francis Emmanuel	Mt. St. Marys College Namagunga
8.	Ssekaggya Ishaq Kasirye	Kawempe Muslim SS
9.	Semulimi Moses	Kampala Polytechnic Mengo
10.	Kiwanuka Abdurahuman	Heritage Voc ss Mbarara

4.6 Facilitator team

This Assessment and Training Package was reviewed by a Facilitator team listed below:

1. **Team Leader:** Ms. Mukyala Ruth Ag Deputy Director, DIT
2. **Facilitators:** Ms. Aheebwa Joan and Ms. Kyatuhire Fortunate
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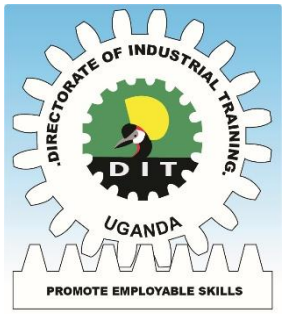
The Assessment and Training Package was reviewed in September 2020 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

References:

1. Schneider, G. (2016). Electrical Installation Guide. *According to IEC International Standard, Technical series, France*.
2. Barthold, L. O., Clayton, R. E., Grant, I. S., Longo, V. J., Stewart, J. R., & Wilson, D. D. (1978). *Transmission line reference book: 115--138 kV compact line design* (No. NP-23255). Electric Power Research Institute, Inc., Palo Alto, CA.
3. Grainger, J. J., Stevenson, W. D., & Stevenson, W. D. (2003). *Power system analysis*.
4. Fulk, M. Z., & Gutman, R. (2019). *U.S. Patent Application No. 29/634,726*.
5. York, N. (2007). Transmission Line Reference Book: 115–138 kV Compact Line Design. *EPRI Transm. Line Ref. B.*, 1-374.
6. Pauley, J. D., Momme, J. E., & Fulk, M. Z. (2019). *U.S. Patent Application No. 29/634,727*.
7. Ferreira, H. C., Grové, H. M., Hooijen, O., & Han Vinck, A. J. (2001). Power line communication. *Wiley Encyclopedia of Electrical and Electronics Engineering*.
8. Sheikh, A. A., Idrees, Q., Ahmad, M., Arshad, M. A., Mahmood, I., Fayyaz, U. U., & Zaffar, N. A. (2016, March). Feasibility of NB-PLC in LT power distribution network of electric utility in Pakistan. In *2016 Clemson University Power Systems Conference (PSC)* (pp. 1-7). IEEE.



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