



**THE REPUBLIC OF UGANDA**  
**Ministry of Education and Sports**

**Directorate of Industrial Training**



**Assessment and Training  
Package**

**For an**

**ELECTRONICS MECHANIC**

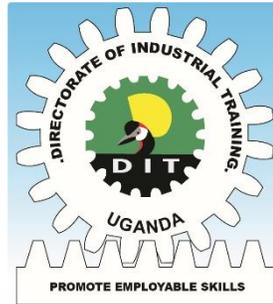
**Qualification Level:1**

**Occupational Cluster: Technology and Design  
(Electronics)**

**September 2020**

**Reviewed by:**  
Qualifications Standards Department  
Directorate Of Industrial Training

**Funded by:**  
Government of Uganda



## **Assessment and Training Package**

### **For an Electronics Mechanic**

**Qualification Level: 1**

**Occupational Cluster: Technology and Design**

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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 an Electronics Mechanic **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 an Electronics Mechanic.** This Occupational Profile which was reviewed by Electronics Mechanics practicing in the world of work mirrors the duties and tasks that Electronics Mechanics are expected to perform.
- 0.2 **PART II: Training Modules** in the form of guidelines to train Electronics Mechanics 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 an Electronics Mechanic. These assessment instruments were reviewed jointly by job practitioners (Electronics Mechanics) 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](mailto: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 Electronics from various Secondary Schools,
- Electronics 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                    |

## Key definitions

|  |   |
|--|---|
| <b>Assessment</b>                        | 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.   |
| <b>Certification</b>                     | 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.   |
| <b>Competence</b>                        | Integration of skills, knowledge, attitudes, attributes and expertise in doing /performing tasks in the world of work to a set standard.  |
| <b>Competency</b>                        | (Occupational) competence is understood as the ability to perform tasks common to an occupation at an acceptable level.   |
| <b>CBET</b>                              | Competence-based education and training means that programmes: <ol style="list-style-type: none"><li>1. have content directly related to work</li><li>2. focus is on 'doing something well'</li><li>3. assessment is based upon industry work standards, and</li><li>4. curricula are developed in modular form</li></ol> |
| <b>Duty</b>                              | 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).   |
| <b>Learning-Working Assignment (LWA)</b> | 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 LWA are real work situations/assignments.   |
| <b>Module</b>                            | 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.  |
| <b>Occupational Profile (OP)</b>         | <p>An Occupational Profile is an overview of the duties and tasks a job incumbent is expected to perform competently in employment.</p> <p>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.</p>           |

Occupational Profiles which define what a person is supposed to do which become the reference points for developing assessment standards and modular curricula.

**Qualification**

A qualification is a formal reward for demonstrating competence, based on formal assessment against set standards and provided to the individual in the 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 an ELECTRONICS MECHANIC

- 1.1 The OCCUPATIONAL PROFILE (OP) for an “ELECTRONICS MECHANIC” below defines the **Duties** and **Tasks** a competent ELECTRONICS MECHANIC 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.

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

<sup>1</sup> The DACUM-method was used. DACUM is an acronym for ‘Develop a Curriculum’

**Expert Panel**

**Kyanda Kasim**

Kasim Computer Centre-Mukono

**Kizito Geoffrey**

Kings College Budo-wakiso

**Muhangi Ustas**

Jarix Computer Solution Ltd  
Mbarara

**Muyige Bonney**

Allien Technologies-Kampala

**Kizito Samuel Makaabugo**

Mpoma School-Mukono

**Kato Bruno**

Hive Technologies-Ishaka-Bushenyi

**Kakoby Swithin Jock**

Ecurei -Rukungiri

**Kavuma Abubaker Lubowa**

Kibuli S.SKampala

**Facilitators**

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Directorate of Industrial Training

**Mawata Grace**

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Directorate of Industrial Training

**Funded by**

Government of Uganda



THE REPUBLIC OF UGANDA  
Ministry of Education and Sports

Directorate of Industrial Training

## Occupational Profile

of an

# "ELECTRONICS MECHANIC"

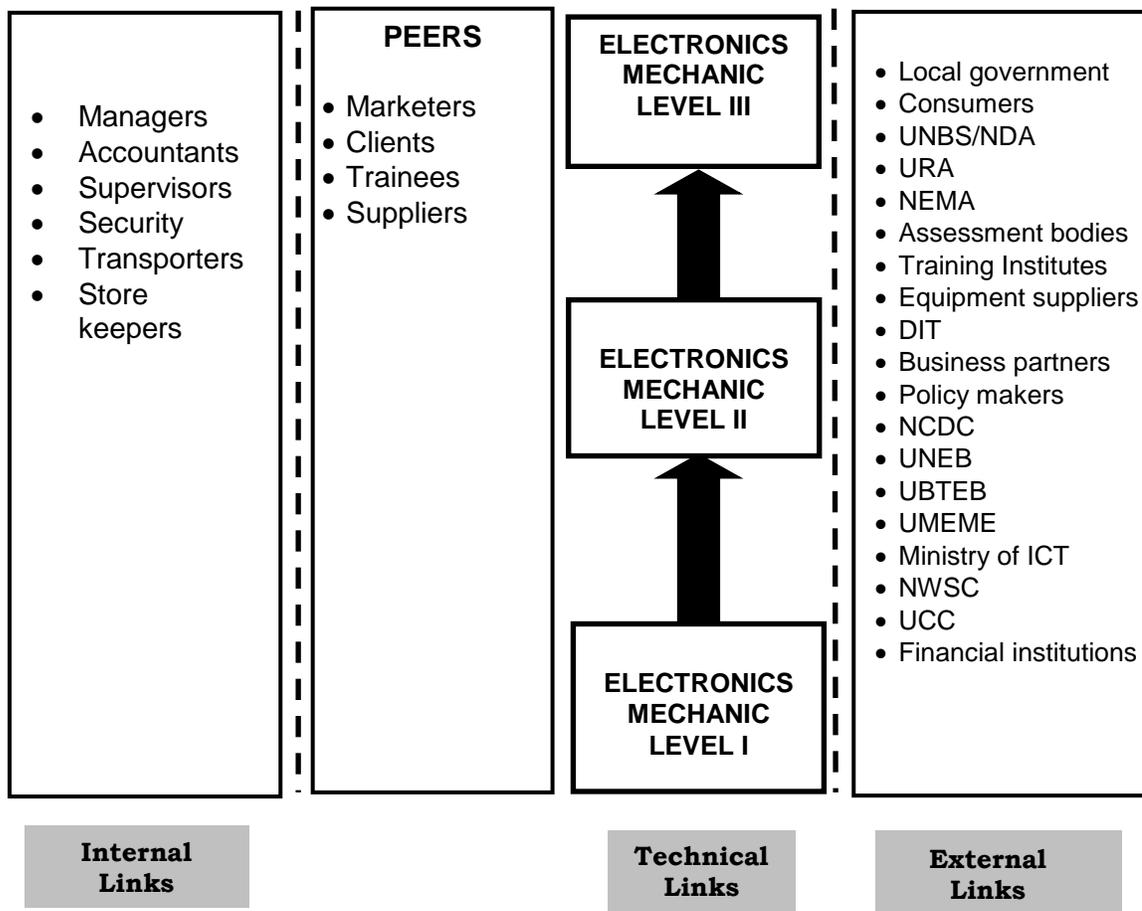
Reviewed by: Directorate of Industrial Training  
(Qualifications Standards)

Dates of workshop: 7<sup>th</sup> –11<sup>th</sup>September 2020

## NOMENCLATURE FOR THE OCCUPATION OF AN ELECTRONICS MECHANICS

**Definition:** An Electronics Mechanic is a person who deals in assessments, fabrication, troubleshooting, assembling, installation, repairing and commissioning of electronic equipment.

### JOB ORGANISATION CHART FOR AN ELECTRONICS MECHANIC



## LEVEL DESCRIPTORS

**An Electronics Mechanic Level I:** Is a person who is able to identify basic electronic components and tools, interpret simple circuit diagrams and apply simple soldering techniques.

**An Electronics Mechanic Level II:** Is a person who is able to identify basic characteristics of electronic components, interpret and rectify electronic circuit up to integrated circuit level.

## Duties and Tasks

|   |  |   |   |
|---|--|---|---|
| <b>A. PLAN WORKS</b>                                | <b>A1</b> Secure workplace                   | <b>A2</b> Prepare work place                        | <b>A3</b> Make consultation                               |
|   | <b>A4</b> Prepare budget                     | <b>A5</b> Sort components                           | <b>A6</b> Select tools                                    |
| <b>B. OBSERVE HEALTH AND SAFETY PRECAUTIONS</b>     | <b>B1</b> Display safety signs               | <b>B2</b> Apply safety regulations                  | <b>B3</b> Wear personal safety gear                       |
|   | <b>B4</b> Wear grounded strap                | <b>B5</b> Maintain firefighting equipment           | <b>B6</b> Provide first Aid facilities                    |
|   | <b>B7</b> Maintain hygiene and sanitation    | <b>B8</b> Sensitise workers on occupational hazards | <b>B9</b> Sensitise stakeholders on communicable diseases |
| <b>C.REPAIR ELECTRONIC EQUIPMENT</b>                | <b>C1</b> Diagnose technical faults          | <b>C2</b> Dismantle equipment                       | <b>C3</b> Solder dry joints                               |
|   | <b>C4</b> De-solder circuit board components | <b>C5</b> Replace faulty electronic components      | <b>C6</b> Provide technical information                   |
|   | <b>C7</b> Assemble equipment                 |   |   |
| <b>D. SERVICE AND MAINTAIN ELECTRONIC EQUIPMENT</b> | <b>D1</b> Set up equipment                   | <b>D2</b> Clean electronic components               | <b>D3</b> Fasten loose components                         |
|   | <b>D4</b> Replace worn out components        | <b>D5</b> Lubricate moving parts                    | <b>D6</b> Clean electronic equipment                      |
|   | <b>D7</b> Test equipment accessories         |   |   |

**FUVQF: Assessment and Training Packages (ATP) for an ELECTRONICS MECHANIC  
QUALIFICATION: LEVEL 1**

**September 2020**

|  |           |                                 |           |                             |           |                            |
|--|-----------|---------------------------------|-----------|-----------------------------|-----------|----------------------------|
| <b>E. INSTALL<br/>ELECTRONIC<br/>CIRCUIT</b> | <b>E1</b> | Interpret circuit designs       | <b>E2</b> | Obtain specifications       | <b>E3</b> | Design electronic circuit  |
|  | <b>E4</b> | Determine equivalent components | <b>E5</b> | Confirm specifications      | <b>E6</b> | Modify electronic circuits |
|  | <b>E7</b> | Test circuit                    | <b>E8</b> | Provide operational manuals |           |                            |

|   |             |                    |             |  |             |  |
|---|-------------|--------------------|-------------|--|-------------|--|
| <b>F. PERFORM<br/>ADMINISTRATIVE<br/>TASK</b> | <b>F1</b>   | Prepare reports    | <b>F2</b>   | Conduct meetings                           | <b>F3</b>   | Supervise workers                                  |
|   | <b>F4</b>   | Orient workers     | <b>F5</b>   | Laise with stakeholders' customer feedback | <b>F6</b>   | Acquire accreditation                              |
|   | <b>F7</b>   | Remunerate workers | <b>F8.</b>  | Provide welfare and safety                 | <b>F9.</b>  | Guidance and counselling                           |
|   | <b>F10.</b> | Train workers      | <b>F11.</b> | Advertise business                         | <b>F12.</b> | Assign work  |
|   | <b>F13.</b> | Manage finance     | <b>F14.</b> | Recruit workers                            | <b>F15.</b> | Procure and dispose tools, materials and equipment |

|                               |           |                    |           |                                      |           |                            |
|-------------------------------|-----------|--------------------|-----------|--------------------------------------|-----------|----------------------------|
| <b>G MAINTAIN<br/>RECORDS</b> | <b>G1</b> | Prepare job cards  | <b>G2</b> | Obtain service manuals               | <b>G3</b> | Prepare dispatch documents |
|                               | <b>G4</b> | File records       | <b>G5</b> | Update records                       | <b>G6</b> | Store records              |
|                               | <b>G7</b> | Maintain inventory | <b>G8</b> | Store tools, materials and equipment |           |                            |

|   |           |                          |           |                       |           |                                   |
|---|-----------|--------------------------|-----------|-----------------------|-----------|-----------------------------------|
| <b>H. PARTICIPATE IN<br/>PROFESSIONAL<br/>DEVELOPMENT</b> | <b>H1</b> | Undertake research       | <b>H2</b> | Consult manufacturers | <b>H3</b> | Participate in seminars/ workshop |
|   | <b>H4</b> | Train for new technology | <b>H5</b> | Adapt new technology  | <b>H6</b> | Participate in technical training |

### Additional Information

|   |  |
|---|--|
| <p><b>1. Generic Knowledge &amp; Skills</b></p> <p>2. Analogue systems</p> <p>3. Communication skills</p> <p>4. Digital system</p> <p>5. Ability to assemble and disassemble</p> <p>6. Ability to interpret technical information</p> <p>7. Should have knowledge on tools</p> <p>8. Should have knowledge on spare parts</p> <p>9. Record keeping</p> <p>10. Should be innovative and creative</p> <p>11. Technical language</p>   | <p>12. Soldering and de-soldering</p> <p>13. Electronic equipment</p> <p>14. Lubricating skills</p> <p>15. Know workshop rules and regulation</p> <p>16. Fault diagnosis procedure</p> <p>17. Use of tools, material and equipment</p> <p>18. Entrepreneurship</p> <p>19. Rights and obligation of stakeholders</p> <p>20. Workshop rule and regulations</p> <p>21. 16.Fault diagnosis procedures</p> <p>22. 17.use of tools, materials and equipment</p> <p>23. 18.Entrepreneurship</p> <p>24. 19.Rights and obligation of stakeholder</p> <p>25. Workshop rules and regulations.</p>   |
| <p><b>Tools, Materials and Equipment</b></p> <p>1. Multimeter/Analogue powered (voltmeter, ammeter, ohmmeter, continuity tester, wattmeter)</p> <p>2. Screw driver</p> <p>3. Mirrors</p> <p>4. Testers</p> <p>5. Soldering kit</p> <p>6. Magnifying glass</p> <p>7. Pliers</p> <p>8. Cutters</p> <p>9. Towels</p> <p>10. Drilling machines</p> <p>11. Grounding strap</p> <p>12. Suckers</p> <p>13. Allen keys</p> <p>14. Battery chargers</p> <p>15. Vice</p> <p>16. Circuit removers</p> <p>17. Magnets</p> <p>18. Hydrometers</p> <p>19. Hacksaws</p> <p>20. Blowers</p> | <p>21. Hetmeter</p> <p>22. Clamp meter</p> <p>23. Oscilloscopes</p> <p>24. Rejuvenators</p> <p>25. Signal generators</p> <p>26. Pattern generator</p> <p>27. Hammers</p> <p>28. High precision screw</p> <p>29. Potentiometer</p> <p>30. Drivers</p> <p>31. Screws</p> <p>32. Spanners/Adjustable</p> <p>33. Computer/software</p> <p>34. Etching machines</p> <p>35. Electronic component tester</p> <p>36. Pairs of tweezers</p> <p>37. File various sizes/types</p> <p>38. Dischargers</p> <p>39. Brushes</p> <p>40. Vero boards</p> <p>41. Bread boards</p> <p>42. Jumpers/connecting wires</p> <p>43. Chip extractors</p> <p>44. Soldering wire</p> <p>45. Invertor</p> <p>46. De-solder wick</p> |

| <b>Attitudes/ Traits/ Behaviour</b>          | <b>Future Trends and Concerns</b>  |
|--|--|
| 1. Honest                                    | 1. More practical training 95% theory at the moment should be 75%  |
| 2. Smart                                     | 2. Provide up to date training to students in institution  |
| 3. Observe work shop rules and regulations   | 3. Current vague training system   |
| 4. Time keeping                              | 4. Training in digital electronics   |
| 5. Economical                                | 5. Computer aided repair   |
| 6. Trust worthy                              | 6. Negative attitude from society towards electronics mechanics is a big concern                                   |
| 7. Good customer relation                    | 7. High level of integrity from electronics mechanics required   |
| 8. Should know when to consult manufacturers | 8. Qualification, certificate, ordinary Diploma, advanced certificate to take a total of 7 years which is too long |
| 9. Observe hygiene and sanitation            | 9. Trade test certificate good but hard to get   |
| 10. Patient                                  |  |
| 11. Reliable                                 |  |
| 12. Creative and innovative                  |  |
| 13. Resourceful                              |  |
| 14. A good listener                          |  |
| 15. Result oriented                          |  |
| 16. Trainable                                |  |
| 17. Strategic                                |  |
| 18. Committed                                |  |
| 19. Practical                                |  |
| 20. Resilient                                |  |
| 21. Sober                                    |  |
| 22. Descent                                  |  |
| 23. Morals                                   |  |
| 24. Hardworking                              |  |
| 25. Punctual                                 |  |
| 26. Hospitable                               |  |

## 2.0 ATP-PART II

### Training Modules for an ELECTRONICS MECHANIC

- 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 and the related Test Items that provide the benchmark for assessment as well as for Curriculum development.
- 2.2 This modular format of the curriculum allows learners of the ELECTRONICS MECHANIC OCCUPATION 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 from training centres and job practitioners. They were developed using the Occupational Profile as a reference point and taking into account the specifications of training and learning outcomes in the form of Test Items described in Part II.
- 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 a training centre or at the work place; or combinations of both.

## WHO IS AN ELECTRONICS MECHANIC QUALIFICATION LEVEL 1?

An ELECTRONICS MECHANIC is a person who is able to identify basic electronic components and tools, interpret simple circuit diagrams and apply simple soldering techniques.

## TRAINING MODULES FOR AN ELECTRONICS MECHANICS UVQ LEVEL 1

| Code           | Module Title  | Average duration |                 |
|----------------|---|------------------|-----------------|
|                |   | Contact hours    | Weeks           |
| UE/EM/M1.1     | Service and Maintain Electronic Equipment           | 320              | 8               |
| UE/EM/M1.2     | Repair Domestic Electronics                         | 320              | 8               |
| UE/EM/M1.3     | Install Decoders and Audio-Visual System            | 160              | 4               |
| UE/EM/M1.4     | Repair Telephony and Mobile Communication Equipment | 200              | 5               |
| UE/EM/M1.5     | Build Simple Electronic Circuit                     | 160              | 4               |
| UE/EM/M1.6     | Perform Basic Entrepreneurship Skills               | 80               | 2               |
| <b>Summary</b> | <b>6 modules</b>                                    | <b>440 hours</b> | <b>11 weeks</b> |

**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 160 hours of nominal learning.

Information given on the average duration of training should be understood as a guideline. Quick learners may need less 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 instruction, as the minimum exposure.

Prior to summative assessment by recognised Agencies, the users of these Module 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 ELECTRONICS MECHANICS

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| <b>Code</b>                                | <b>UE/EM/M1.1</b>   |
| <b>Module title</b>                        | <b>M1.1: Service and Maintain Electronic Equipment</b>  |
| <b>Related Qualification</b>               | <u>Part of:</u><br>Uganda Vocational Qualification<br>(ELECTRONICS MECHANIC UVQ1)   |
| <b>Qualification Level</b>                 | 1   |
| <b>Module purpose</b>                      | After completion of this module, the trainee shall be able to service, maintain, diagnose faults and repair faulty electronic equipment effectively.  |
| <b>Learning-Working Assignments (LWAs)</b> | <p><b>LWA 1/1: Carryout Preventive Maintenance</b><br/> <b>LWA 1/2: Carry out corrective Maintenance</b><br/> <b>LWA 1/3: Observe Occupational Health, Safety and Environment Protection Practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. The learning exercises may be repeated until the trainee acquires a targeted competence.</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ol>  |
| <b>Related Practical Exercises (PEXs)</b>  | <p><b>LWA 1/1: Carryout Preventive Maintenance</b><br/>                 PEX 1.1. Disassemble equipment<br/>                 PEX 1.2. Clean equipment<br/>                 PEX 1.3. Lubricate moving parts<br/>                 PEX 1.4. Check and tighten loose connections<br/>                 PEX 1.5. Assemble equipment<br/>                 PEX 1.6. Test run equipment</p> <p><b>LWA 1/2: Carryout Corrective Maintenances</b><br/>                 PEX 2.1. Check equipment operation<br/>                 PEX 2.2. Disassemble equipment<br/>                 PEX 2.3. Diagnose fault<br/>                 PEX 2.4. Replace faulty components<br/>                 PEX 2.5. Assemble equipment<br/>                 PEX 2.6. Test run equipment</p> <p><b>LWA 1/3: Observe Occupational Health, Safety and Environmental Protection Practices</b><br/>                 PEX 3.1. Wear protective gear</p> |

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|  | PEX 3.2. Provide first aid<br>PEX 3.3. Manage waste<br>PEX 3.4. Perform firefighting  |
| <b>Occupational health and safety</b>                              | 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.   |
| <b>Pre-requisite modules</b>                                       | None  |
| <b>Related knowledge/ theory</b>                                   | <p><i>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:</i></p> <ul style="list-style-type: none"> <li>• Tools and their uses</li> <li>• Assemble equipment</li> <li>• Identification of different components and their functions</li> <li>• Identification of cleaning solutions and their uses</li> </ul> |
| <b>Average duration of learning</b>                                | 320 hours (40days) of normal learning suggested to include:<br><i>5 days of occupational theory and<br/>                 35 days of occupational practices</i>  |
| <b>Suggestions on organisation of learning</b>                     | The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.  |
| <b>Assessment</b>  | Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank   |
| <b>Minimum required tools/ equipment/ implements or equivalent</b> | Set of screw drivers<br>Blower<br>Spanners<br>Soldering iron<br>Solder suckers<br>Multimeter  |
| <b>Minimum required materials and consumables or equivalent</b>    |   |
| <b>Special notes</b>   |   |

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| <b>Code</b>                                | <b>UE/EM/M1.2</b>  |
| <b>Module title</b>                        | <b>M1.2: Repair Domestic Electronic Equipment</b>  |
| <b>Related Qualification</b>               | <u>Part of:</u><br>Uganda Vocational Qualification<br>(ELECTRONICS MECHANIC UVQ1)  |
| <b>Qualification Level</b>                 | 1  |
| <b>Module purpose</b>                      | The trainee(s) shall be able to repair Radio, Woofer, TVs, Decoders, Chargers effectively  |
| <b>Learning-Working Assignments (LWAs)</b> | <p><b>LWA 2/1: Disassemble Equipment</b></p> <p><b>LWA 2/2: Troubleshoot and Repair Electronic Circuits</b></p> <p><b>LWA 2/3: Assemble Equipment</b></p> <p><b>LWA 2/4: Observe Occupational Health, safety and Environmental Protection Practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. <i>The learning exercises may be repeated until the trainee acquires a targeted competence.</i></li> <li>2. <i>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i></li> </ol>  |
| <b>Related Practical Exercises (PEXs)</b>  | <p><b>LWA 2/1: Disassemble Equipment</b></p> <p>PEX 1.1. Identify tools<br/>                 PEX 1.2. Detach connected parts<br/>                 PEX 1.3. Organise the disconnected parts</p> <p><b>LWA 2/2: Trouble Shoot and Repair Electronic Equipment</b></p> <p>PEX 2.1. Identify detached parts<br/>                 PEX 2.2. Identify tools<br/>                 PEX 2.3. Test the component</p> <p><b>LWA 2/3: Assemble Equipment</b></p> <p>PEX 3.1. Identify the detached parts<br/>                 PEX 3.2. Identify tools<br/>                 PEX 3.3. Connect parts<br/>                 PEX 3.4. Test equipment</p> <p><b>LWA 2/4: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p>PEX 4.1. Wear protective gear<br/>                 PEX 4.2. Manage waste<br/>                 PEX 4.3. Observe personal hygiene<br/>                 PEX 4.4. Administer first aid<br/>                 PEX 4.5. Perform firefighting</p> |

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| <b>Occupational health and safety</b>                              | 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.   |
| <b>Pre-requisite modules</b>                                       | None  |
| <b>Related knowledge/ theory</b>                                   | <p><i>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:</i></p> <ul style="list-style-type: none"> <li>• Identity different type of domestic electronic gadgets</li> <li>• Describe the procedures of assembling and disassembling electronic equipment</li> <li>• Ability to the interpret electronic circuits</li> <li>• Describe different types of electronic components</li> <li>• Identify different circuit models</li> <li>• Classify different tools and equipment and related functions</li> <li>• Describe different ways of recognising fault conditions</li> </ul> |
| <b>Average duration of learning</b>                                | <p>320 hours (40days) of normal learning suggested to include:</p> <ul style="list-style-type: none"> <li>• 5 days of occupational theory and</li> <li>• 35 days of occupational practices</li> </ul>   |
| <b>Suggestions on organisation of learning</b>                     | The acquisition of competencies (skills. Knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.  |
| <b>Assessment</b>  | Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank   |
| <b>Minimum required tools/ equipment/ implements or equivalent</b> | digital metre, analogue meter, soldering kit, crew drivers, venous plier, Allen key, signal generator   |
| <b>Special notes</b>   |   |

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| <b>Code</b>                                | <b>UE/EM/M1.3</b>  |
| <b>Module title</b>                        | <b>M1.3:Install Decoder and Audio- Visual System</b>   |
| <b>Related Qualification</b>               | Part of:<br>Uganda Vocational Qualification<br>(ELECTRONICS MECHANIC UVQ1)   |
| <b>Qualification Level</b>                 | 1  |
| <b>Module purpose</b>                      | At the end of this module, a trainee shall be able to install decoders, antennas and audio visual systems  |
| <b>Learning-Working Assignments (LWAs)</b> | <p><b>LWA 3/1: Install Decoder and Antennas</b><br/> <b>LWA 3/2: Install Audios Systems</b><br/> <b>LWA 3/3: Install Video Systems</b><br/> <b>LWA 3/4: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. The learning exercises may be repeated until the trainee acquires a targeted competence.</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ol>   |
| <b>Related Practical Exercises (PEXs)</b>  | <p><b>LWA 3/1: Install Decoder and Antennas</b><br/>                 PEX 3.1 Prepare tools<br/>                 PEX 3.2 Trace radio signals<br/>                 PEX 3.3 Mount equipment<br/>                 PEX 3.4 Test equipment</p> <p><b>LWA 3/2: Install Audios System</b><br/>                 PEX 2.1. Identify tools<br/>                 PEX 2.2. Measure distance<br/>                 PEX 2.3. Determine cable size, pin-outs and interfaces<br/>                 PEX 2.4. Connect inter-related accessories<br/>                 PEX 2.5. Test audio out put</p> <p><b>LWA 3/3: Install Video System</b><br/>                 PEX 3.1. Identify tools<br/>                 PEX 3.2. Measure distance<br/>                 PEX 3.3. Determine cable size, pin-out and interfaces<br/>                 PEX 3.4. Connect inter-related accessories<br/>                 PEX 3.5. Test video out put</p> <p><b>LWA 3/4: Observe Occupational Health, Safety and Environmental Protection Practices</b><br/>                 PEX 4.1. Wear protective<br/>                 PEX 4.2. Perform firefighting<br/>                 PEX 4.3. Speak position</p> |

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|  | PEX 4.4. Regulate audio out put  |
| <b>Occupational health and safety</b>                              | 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.  |
| <b>Pre-requisite modules</b>                                       | None   |
| <b>Related knowledge/ theory</b>                                   | <p><i>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:</i></p> <ul style="list-style-type: none"> <li>• Describe signal transmission</li> <li>• Distinguish between different types of audio visual system</li> <li>• Explain the construction and operating principles of different types of audio system</li> <li>• Describe the uses of the different measuring instrument</li> <li>• Identify different tools, materials and their applications</li> <li>• Describe how to recognise fault conditions</li> <li>• Identify different types of cable sizes</li> <li>• Interpret polarities and connections</li> <li>• Calculate angles of elevations</li> </ul> |
| <b>Average duration of learning</b>                                | <p>160 hours (20 days) of normal learning suggested to include:</p> <ul style="list-style-type: none"> <li>• 5 day of occupational theory and</li> <li>• 15 days of occupational practice</li> </ul>   |
| <b>Suggestions on organisation of learning</b>                     | The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.   |
| <b>Assessment</b>  | Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank  |
| <b>Minimum required tools/ equipment/ implements or equivalent</b> | Multimeter, cutter, hammer, nails, hacker saw, cables, battery, screw drivers, invertor, insulating tape, measuring tape, driller, radio signal finder   |
| <b>Special notes</b>   |  |

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| <b>Code</b>                                | <b>UE/EM/M1.4</b>   |
| <b>Module title</b>                        | <b>M1.4: Repair Telephone and Mobile Equipment</b>  |
| <b>Related Qualification</b>               | Part of:<br>Uganda Vocational Qualification<br>(ELECTRONICS MECHANIC UVQ1)  |
| <b>Qualification Level</b>                 | 1   |
| <b>Module purpose</b>                      | At the end of this module, a trainee shall be able to repair different types of mobile and communication equipment  |
| <b>Learning-Working Assignments (LWAs)</b> | <p><b>LWA 4/1: Disassemble Mobile Equipment</b><br/> <b>LWA 4/2: Troubleshoot Mobile Equipment</b><br/> <b>LWA 4/3: Assemble Mobile Equipment</b><br/> <b>LWA 4/4: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1 The learning exercises may be repeated until the trainee acquires a targeted competence.</li> <li>2 The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ol>   |
| <b>Related Practical Exercises (PEXs)</b>  | <p><b>LWA 4/1: Disassemble Mobile Equipment</b><br/>                 PEX 1.1. Identify appropriate tools<br/>                 PEX 1.2. Switch off devices<br/>                 PEX 1.3. Detach the connected parts<br/>                 PEX 1.4. Organise detached parts</p> <p><b>LWA 4/2: Troubleshoot Mobile Equipment</b><br/>                 PEX 2.1. Identify phone circuit model<br/>                 PEX 2.2. Test components<br/>                 PEX 2.3. De-solder the faulty parts /components<br/>                 PEX 2.4. Solder new components<br/>                 PEX 2.5. Test fixed components</p> <p><b>LWA 4/3: Assemble Mobile Equipment</b><br/>                 PEX 3.1 Identify detached parts<br/>                 PEX 3.2 Connect parts<br/>                 PEX 3.3 Test device</p> <p><b>LWA 4/4: Observe Occupational Health, Safety and Environmental Protection Practices</b><br/>                 PEX 4.1. Wear protective gear<br/>                 PEX 4.2. Firefighting<br/>                 PEX 4.3. Speak position<br/>                 PEX 4.4. Regulate audio out put</p> |

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| <b>Occupational health and safety</b>                              | 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.   |
| <b>Pre-requisite modules</b>                                       | None  |
| <b>Related knowledge/ theory</b>                                   | <p><i>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:</i></p> <ul style="list-style-type: none"> <li>• Identify tools and their different application</li> <li>• Diagnose fault conditions</li> <li>• Identity different components and their uses</li> <li>• Describe the uses of different measuring instrument</li> <li>• Explain different method of testing circuit</li> <li>• Describe the process of assembling and disassembling an electronic equipment</li> <li>• Interpret manual of different electronic equipment</li> </ul> |
| <b>Average duration of learning</b>                                | <p>320hours (40days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> <li>• 10 days for occupational theory and</li> <li>• 30days for occupational practical</li> </ul>   |
| <b>Suggestions on organisation of learning</b>                     | The acquisition of competencies (skills. Knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.  |
| <b>Assessment</b>  | Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank   |
| <b>Minimum required tools/ equipment/ implements or equivalent</b> | multimeter, cutter, hammer, nails, hacker saw, cables, battery, screwdrivers, invertor, insulating tape, measuring tape, driller, radio signal finder   |
| <b>Minimum required materials and consumables or equivalent</b>    | nails, cables   |
| <b>Special notes</b>   |   |

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| <b>Code</b>                                | <b>UE/EM/M1.5</b>  |
| <b>Module title</b>                        | <b>M1.5: Build Simple Electronic Circuit</b>   |
| <b>Related Qualification</b>               | <u>Part of:</u><br>Uganda Vocational Qualification<br>(ELECTRONICS MECHANIC UVQ1)  |
| <b>Qualification Level</b>                 | 1  |
| <b>Module purpose</b>                      | At the end of this module, a trainee shall be able to construct electronic circuit diagram.  |
| <b>Learning-Working Assignments (LWAs)</b> | <p><b>LWA 5/1: Interpret Circuit Diagram</b></p> <p><b>LWA 5/2: Identify Components</b></p> <p><b>LWA 5/3: Prepare Tools and Equipment</b></p> <p><b>LWA 5/4: Construct Circuit</b></p> <p><b>LWA 5/5: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. <i>The learning exercises may be repeated until the trainee acquires a targeted competence.</i></li> <li>2. <i>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i></li> </ol>  |
| <b>Related Practical Exercises (PEXs)</b>  | <p><b>LWA 5/1: Interpret Circuit Diagram</b></p> <p>PEX1.1: Interpret symbols and polarity of components</p> <p>PEX1.2: Sketch a layout for components</p> <hr/> <p><b>LWA 5/2: Identify Components</b></p> <p>PEX2.1: Identify resistors</p> <p>PEX2.2: Identify capacitors</p> <p>PEX2.3: Identify diodes</p> <p>PEX2.4: Identify transistors</p> <hr/> <p><b>LWA 5/3: Prepare Tools and Equipment</b></p> <p>PEX3.1: Identify tool usage</p> <p>PEX3.2: Measure resistor characteristics</p> <p>PEX3.3: Measure capacitor characteristics</p> <p>PEX3.4: Measure diode characteristics</p> <p>PEX3.5: Measure transistor characteristics</p> <hr/> <p><b>LWA 5/4: Construct Circuit</b></p> <p>PEX4.1: Mount components</p> <p>PEX4.2: Solder component</p> <p>PEX4.3: Trim component</p> <p>PEX4.4: Test run circuit</p> |

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|  | <p><b>LWA 5/5: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p>PEX5.1: Wear protective gear<br/>                 PEX5.2: Demonstrate personal hygiene<br/>                 PEX5.3: Manage wastes<br/>                 PEX5.4: Perform firefighting<br/>                 PEX5.5: Administer first aid</p>  |
| <b>Occupational health and safety</b>                              | 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.   |
| <b>Pre-requisite modules</b>                                       | None  |
| <b>Related knowledge/ theory</b>                                   | <p><i>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:</i></p> <ul style="list-style-type: none"> <li>• Interpret technical information</li> <li>• Identify different electronic equipment, components and their application</li> <li>• Identify tools and materials</li> <li>• Describe the use of different measuring instruments</li> <li>• Explain common electrical and electronic terms</li> <li>• Describe the different methods of testing circuits</li> <li>• Perform basic electrical and electronic calculations</li> </ul> |
| <b>Average duration of learning</b>                                | <p>120 hours (15days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> <li>• <i>5days for occupational theory</i></li> <li>• <i>10days for occupational practical</i></li> </ul>  |
| <b>Suggestions on organisation of learning</b>                     | The acquisition of competencies (skills. Knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.  |
| <b>Assessment</b>  | Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank   |
| <b>Minimum required tools/ equipment/ implements or equivalent</b> | multi-meter, solder gun, copper board   |

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| <b>Minimum required materials and consumables or equivalent</b> | solder wick/ solder sucker |
| <b>Special notes</b>  | Provide designed circuit   |

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| <b>Code</b>                                | <b>UE/EM/M1.6</b>   |
| <b>Module title</b>                        | <b>M1.6: Perform Basic Entrepreneurship Tasks</b>   |
| <b>Related Qualification</b>               | <u>Part of:</u><br>Uganda Vocational Qualification<br>(ELECTRONICS MECHANIC UVQ1)   |
| <b>Qualification Level</b>                 | 1   |
| <b>Module purpose</b>                      | At the end of this module, a trainee shall be able and establish and manage electronic enterprise effectively   |
| <b>Learning-Working Assignments (LWAs)</b> | <p><b>LWA 6/1: Communicate with Stakeholders</b></p> <p><b>LWA 6/2: Manage Human Resource</b></p> <p><b>LWA 6/3: Generate Records</b></p> <p><b>LWA 6/4: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. The learning exercises may be repeated until the trainee acquires a targeted competence.</li> <li>2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</li> </ol> |
| <b>Related Practical Exercises (PEXs)</b>  | <p><b>LWA 6/1: Communicate with Stakeholders</b></p> <p>PEX 1.1. Inform clients of the available electronics</p> <p>PEX 1.2. Negotiate prices with stakeholder</p> <p>PEX 1.3. Advice clients on the products</p> <p><b>LWA 6/2: Manage Human Resource</b></p> <p>PEX 2.1. Recruit worker</p> <p>PEX 2.2. Train worker</p> <p>PEX 2.3. Orient workers</p> <p>PEX 2.4. Manage finances</p> <p><b>LWA 6/3: Generate Records</b></p> <p>PEX 3.1. Prepare sales records</p> <p>PEX 3.2. Prepare inventory</p> <p>PEX 3.3. Prepare financial records</p>                       |

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|   | <p><b>LWA 6/4: Observe Occupational Health, Safety and Environmental Protection Practices</b></p> <p>PEX 4.1. Wear protective gears<br/>                 PEX 4.2. Demonstrate personal hygiene<br/>                 PEX 4.3. Manage waste<br/>                 PEX 4.4. Administer first aid<br/>                 PEX 4.5. Complying with safety policies and regulations<br/>                 PEX 4.6. Perform firefighting</p>   |
| <b>Occupational health and safety</b>                           | Precautions, rules and regulations of applications safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.   |
| <b>Pre-requisite modules</b>                                    | None   |
| <b>Related knowledge/ theory</b>                                | <p><i>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:</i></p> <ul style="list-style-type: none"> <li>• Starting up electronic business</li> <li>• Marketing skills</li> <li>• Communication skills</li> <li>• Record keeping</li> <li>• Advertising skills</li> <li>• Pricing techniques</li> <li>• Budgeting</li> </ul> |
| <b>Average duration of learning</b>                             | <p>40 hours (5 days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> <li>• 1 day of occupational theory and</li> <li>• 4 days of occupational practice</li> </ul>   |
| <b>Suggestions on organisation of learning</b>                  | The acquisition of competencies (skills. Knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided all equipment and materials required for training are in place.   |
| <b>Assessment</b>   | Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank  |
| <b>Minimum required materials and consumables or equivalent</b> | computer, calculator, pens, pencils, file folders, filing cabinets, printer, telephone, table document tray, basket, first aid box, public speakers, apron, ledger book  |
| <b>Special notes</b>  |  |

## 3.0 ATP-PART III

### Assessment Instruments for an ELECTRONICS MECHANIC

- 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 or not. In this ATP the **standards** to assess occupational competences are reflected in the form of the Occupational Profile and related Test Items.
- 3.2 Assessment of occupational competence should comprise both practical (performance) testing and written (theory/knowledge) testing.
- 3.3 Based on the Occupational Profile, a combined panel of job practitioners and Instructors developed 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 Directorate of Industrial Training.
- 3.4 Performance (Practical) Test Items (PTI) are closely related to typical work situations in Ugandan business and manufacturing enterprises. They comprise 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 and,
  - 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, the following samples of test items for assessing both performance (practical) and occupational knowledge (theory) of **ELECTRONICS MECHANIC** are included:

3.9 Overview of Test Item samples included:

| No. | Type of Test Item                               | Numbers included |
|-----|---|------------------|
| 1.  | Written (Theory)- short answer                  | 2                |
| 2.  | Written (Theory)- multiple choice               | 3                |
| 3.  | Written (Theory)- matching item- generic        | 1                |
| 4.  | Written (Theory)- matching item (work sequence) | 1                |
| 5.  | Performance (Practical) test items              | 2                |
|     | <b>Total</b>                                    | 9                |

### WRITTEN TEST ITEMS (SAMPLES)

| DIT/ QS             | Test Item Database<br>Written (Theory) Test Item- No. 1 |         |                  |                   |
|---------------------|---|---------|------------------|-------------------|
| Occupational Title: | Electronics Mechanic                                    |         |                  |                   |
| Competence level:   | Level 1   |         |                  |                   |
| Code no.            |   |         |                  |                   |
| Test Item type:     | Short answer  | √       |                  |                   |
|                     | Multiple choice   |         |                  |                   |
|                     | Matching item   | Generic | Cause-<br>Effect | Work-<br>sequence |
|                     |   |         |                  |                   |
| Complexity level:   | C3  |         |                  |                   |
| Date of OP:         | September 2020  |         |                  |                   |
| Related modules:    | M 1.1   |         |                  |                   |
| Time allocation:    | 3 minutes   |         |                  |                   |

| Test Item              | List three basic components of electronic circuit   |
|------------------------|---|
| Answer spaces          | (i) .....<br>(ii) .....<br>(iii) .....  |
| Expected key (answers) | (i) Power source (Battery, cells)<br>(ii) Load<br>(iii) Connecting wires/Cables<br>(iv) Fuse/circuit breakers<br>(v) Switch |

| DIT/ QS             | Test Item Database<br>Written (Theory) Test Item- No. 2 |         |               |               |
|---------------------|---|---------|---------------|---------------|
| Occupational Title: | Electronics Mechanic                                    |         |               |               |
| Competence level:   | 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 modules:    | M 1.1   |         |               |               |
| Time allocation:    | 3 minutes   |         |               |               |

|                        |   |
|------------------------|---|
| Test Item              | Mention any three examples of domestic electronic equipment                         |
| Answer spaces          | (i) .....<br>(ii) .....<br>(iii) .....  |
| Expected key (answers) | (i) DVD player<br>(ii) Radio<br>(iii) Home theatre<br>(iv) Television<br>(v) Woofer |

| DIT/ QS             | Test Item Database<br>Written (Theory) Test Item- no. 3 |         |               |               |
|---------------------|---|---------|---------------|---------------|
| Occupational Title: | Electronics Mechanic                                    |         |               |               |
| 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:     | M1.4  |         |               |               |
| Time allocation:    | 2 minutes   |         |               |               |

|                                 |  |
|---------------------------------|--|
| Test Item                       | A 2F a4F and a10F capacitor connected in series. The total capacitance is..... |
| Distractors and correct answers | A. 14ΩF<br>B. 12ΩF<br>C. 16ΩF<br>D. 8ΩF  |

|              |   |
|--------------|---|
| Key (answer) | C |
|--------------|---|

| DIT/ QS             | Test Item Database<br>Written (Theory) Test Item- no.4 |         |               |               |
|---------------------|--|---------|---------------|---------------|
| Occupational Title: | Electronics Mechanic                                   |         |               |               |
| 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 1.2  |         |               |               |
| Time allocation:    | 2 minutes  |         |               |               |

|                                 |   |
|---------------------------------|---|
| Test Item                       | A thermistor is type of.....                              |
| Distractors and correct answers | A. Switch<br>B. Resistor<br>C. Battery<br>D. Power supply |

|              |   |
|--------------|---|
| Key (answer) | B |
|--------------|---|

| DIT/ QS             | Test Item Database<br>Written (Theory) Test Item- No.5 |         |                  |                   |
|---------------------|--|---------|------------------|-------------------|
| Occupational Title: | Electronics Mechanic                                   |         |                  |                   |
| Competence level:   | Level 1  |         |                  |                   |
| Code no.            |  |         |                  |                   |
| Test Item type:     | Short answer   |         |                  |                   |
|                     | Multiple choice  | √       |                  |                   |
|                     | Matching item  | Generic | Cause-<br>Effect | Work-<br>sequence |
|                     |  |         |                  |                   |
| Complexity level:   | C2   |         |                  |                   |
| Date of OP:         | September 2020   |         |                  |                   |
| Related modules:    | M1.3   |         |                  |                   |
| Time allocation:    | 2 minutes  |         |                  |                   |

|                                |   |
|--------------------------------|---|
| Test Item                      | In practical application, battery voltage.....  |
| Distracters and correct answer | A. Is restored as soon as disconnected<br>B. Is lowered as the load increase<br>C. May be stored in definitely<br>D. Will reduce to zero as power is down |

|              |   |
|--------------|---|
| Key (answer) | B |
|--------------|---|

| DIT/ QS             |                      | Test Item Database<br>Written (Theory) Test Item- no. 6 |              |               |  |
|---------------------|----------------------|---|--------------|---------------|--|
| Occupational Title: | Electronics Mechanic |   |              |               |  |
| 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:     | M1.2                 |   |              |               |  |
| Time allocation:    | 2 minutes            |   |              |               |  |

|                  |   |
|------------------|---|
| <b>Test Item</b> | Match the following tools with their uses |
|------------------|---|

| Tools |                  |
|-------|------------------|
| A     | Pair of scissors |
| B     | Soldering gun    |
| C     | Measuring tape   |
| D     | Hand drill       |
| E     | Screw driver     |
|       |                  |
|       |                  |
|       |                  |

| Uses |                         |
|------|-------------------------|
| 1    | Remove screws           |
| 2    | Cuts wires              |
| 3    | Bores holes in the wall |
| 4    | Melts solder            |
| 5    | Measure length          |
| 6    | Measure voltage         |
| 7    | Removes pins            |
| 8    | Burns wires             |

|                     |                        |
|---------------------|------------------------|
| <b>Key (answer)</b> | A:2, B:4, C:5, D:4,E:1 |
|---------------------|------------------------|

| DIT/ QS             | Test Item Database<br>Written (Theory) Test Item- no. 7 |         |              |               |
|---------------------|---|---------|--------------|---------------|
| Occupational Title: | Electronics Mechanic                                    |         |              |               |
| Competence level:   | 1   |         |              |               |
| Code no.            |   |         |              |               |
| Test Item type:     | Short answer  |         |              |               |
|                     | Multiple choice   |         |              |               |
|                     | Matching item   | Generic | Cause-Effect | Work-sequence |
|                     |   |         |              | √             |
| Complexity level:   | C 2   |         |              |               |
| Date of OP:         | September 2020  |         |              |               |
| Related modules:    | M 1.1   |         |              |               |
| Time allocation:    | 4 minutes   |         |              |               |

|           |  |
|-----------|--|
| Test Item | Arrange the following work steps in correct sequence of repairing radio device |
|-----------|--|

| (Chronological order) | Column B (work steps) in wrong chronological order |                            |
|-----------------------|--|----------------------------|
| 1 <sup>st</sup>       | A  | Identify circuit model     |
| 2 <sup>nd</sup>       | B  | Test circuit               |
| 3 <sup>rd</sup>       | C  | Identify tools             |
| 4 <sup>th</sup>       | D  | Detach connected parts     |
| 5 <sup>th</sup>       | E  | De-solder fault components |
| 6 <sup>th</sup>       | F  | Disassemble radio          |
| 7 <sup>th</sup>       | G  | Solder working components  |
| 8 <sup>th</sup>       | H  | Assemble radio parts       |
| 9 <sup>th</sup>       | I  | Test radio                 |
| 10 <sup>th</sup>      | J  | Test components            |

|              |   |
|--------------|---|
| Key (answer) | 1:C, 2:F, 3:D, 4:A, 5:J, 6:E, 7:G, 8:B,9:H,10:I |
|--------------|---|

## PERFORMANCE TEST ITEMS (SAMPLES)

| DIT/ QS   | Test Item Database<br>Performance Test Item- no.8  |
|---|--|
| <b>Occupational Title:</b>                      | Electronics Mechanic   |
| <b>Competence level:</b>                        | Level 1  |
| <b>Code no.</b>                                 |  |
| <b>Test Item:</b>                               | Mount digital video-broad casting –terrestrial ,radio frequency antenna for free to air TV reception   |
| <b>Complexity level:</b>                        | P2   |
| <b>Date of OP:</b>                              | September 2020   |
| <b>Related modules:</b>                         | M1.1   |
| <b>Related skills and knowledge:</b>            | <ul style="list-style-type: none"> <li>▪ Antenna installation,</li> <li>▪ Electronic equipment</li> <li>▪ Assembly, measurement,</li> <li>▪ Audio-visual pin out,</li> <li>▪ Electronic equipment connections</li> </ul> |
| <b>Required tools, Materials and Equipment:</b> | Hammer, saw, radio signal finder, hand driller, Antenna, decoder TV, cables, box, ladder, Helmet, safety shoes, overcoat, screw driver, pliers, spanners, belt alien keys, watch   |
| <b>Time allocation:</b>                         | 3 hours  |
| <b>Preferred venue:</b>                         | Institution workshop   |
| <b>Remarks for candidates</b>                   | <ul style="list-style-type: none"> <li>▪ Be punctual</li> <li>▪ Observe health, safety and environmental precautions</li> <li>▪ Dress in work shop wear</li> </ul>   |
| <b>Remarks for assessors</b>                    | <ul style="list-style-type: none"> <li>▪ Provide antennas, TV and power source</li> <li>▪ Provide RF signal finder</li> </ul>  |

| #            | Assessment criteria      | Scoring guide  | Max. Score |           |
|--------------|--------------------------|--|------------|-----------|
|              |                          |  | Process    | Result    |
| 1            | Prepare for the task     | <u>Wore protective gear:</u> <ul style="list-style-type: none"> <li>• Overall</li> <li>• Gum boots</li> <li>• Safety shoes</li> <li>• Head gear</li> </ul> |            | 4         |
| 2            | Prepare work bench       | Cleaned work shop  | 1          |           |
|              |                          | No dirt observed in workshop   |            | 3         |
|              |                          | Prepared tools and materials in place  | 3          |           |
| 3            | Open TV set              | Disconnect power   | 1          |           |
|              |                          | Removed the back cover   |            | 1         |
|              |                          | Screws placed in a container   | 2          |           |
| 4            | Clean the interior of TV | Blew dust from the interior  | 3          |           |
|              |                          | No dust observed in the interior   |            | 4         |
|              |                          | Inclined the blower nassel   | 2          |           |
|              |                          | Brushed corroded surface   |            | 1         |
|              |                          | No dust observed   |            | 2         |
| 5            | Close TV set             | Cover put back   | 2          |           |
|              |                          | Tightened screws   |            | 3         |
| 6            | TV screen                | Cleaned screen   | 2          |           |
|              |                          | No dust observed on screen   |            | 2         |
|              |                          | Cleaned housing  | 3          |           |
|              |                          | No dirt observed on housing  |            | 3         |
| 7            | Test run                 | TV connected to power source   | 2          |           |
|              |                          | TV switched on   |            | 2         |
|              |                          | Video output observed  |            | 3         |
|              |                          | No damages observed  |            | 3         |
| <b>TOTAL</b> |                          |  | <b>23</b>  | <b>35</b> |

|   |   |
|---|---|
| <b>DIT/ QS</b>                                  |   |
| <b>Occupational Title:</b>                      | Electronics Mechanic  |
| <b>Competence level:</b>                        | Level 1   |
| <b>Code no.</b>                                 |   |
| <b>Test Item:</b>                               | Service a TV set  |
| <b>Complexity level:</b>                        | P2  |
| <b>Date of OP:</b>                              | September 2020  |
| <b>Related module:</b>                          | M1.2  |
| <b>Related skills and knowledge:</b>            | <ul style="list-style-type: none"> <li>• Disassembling equipment skills</li> <li>• Using blowers</li> <li>• Using cleaning detergent</li> <li>• Assembling TV</li> </ul>  |
| <b>Required tools, Materials and Equipment:</b> | Blower, towels, screw drivers, overall, facemasks, gloves, foam cleaners, brush, goggles, workshop safety shoes   |
| <b>Time allocation:</b>                         | 2 hours   |
| <b>Preferred venue:</b>                         | Institution work place  |
| <b>Remarks for candidates</b>                   | <ul style="list-style-type: none"> <li>• Observe workshop regulation and safety</li> <li>• Have protective gear</li> <li>• Be punctual</li> <li>• Dress in workshop wear</li> <li>• Provide tool kit</li> </ul> |
| <b>Remarks for assessors</b>                    | <ul style="list-style-type: none"> <li>• Provide a TV set</li> <li>• Provide a cleaning tool kit</li> </ul>   |

| # | Assessment criteria | Scoring guide   | Max. Score |        |
|---|---------------------|---|------------|--------|
|   |                     |   | Process    | Result |
| 1 | Prepare for task    | Wore protective gears <ul style="list-style-type: none"> <li>• helmet</li> <li>• safety shoes,</li> <li>• overcoat</li> </ul> |            | 3      |
|   |                     | Cleaned work place  | 1          |        |
|   |                     | Assembled tools and material  |            | 2      |

| # | Assessment criteria                     | Scoring guide                          | Max. Score |           |
|---|---|--|------------|-----------|
|   |   |  | Process    | Result    |
| 2 | Install antenna                         | Attached parts                         | 3          |           |
|   |   | Connected RF cables                    | 3          |           |
|   |   | Fastened antenna to the poles          | 2          |           |
|   |   | Oriented at 90%                        | 2          |           |
|   |   | Elevate the pole                       | 1          |           |
|   |   | Traced RF Source                       | 4          |           |
|   |   | Observed at least 70% signal strength  |            | 3         |
| 3 | Connect decoder                         | Connected RF cable to decoder          | 1          |           |
|   |   | Connected audio-visual pins and cables | 3          |           |
| 4 | Connect TV                              | Positioned TV set                      | 1          |           |
|   |   | Visibly positioned TV set              |            | 2         |
|   |   | Connected audio-visual pins and cables | 2          |           |
| 5 | Test and run                            | Connected decoder to AC source         | 1          |           |
|   |   | Connected TV to AC source              | 1          |           |
|   |   | Switched on power source               | 1          |           |
|   |   | Switched on TV and decoder             | 2          |           |
|   |   | Video and audio output achieved        |            | 4         |
| 6 | Demobilise work place                   | Cleaned work shop                      | 1          |           |
|   |   | Managed waste                          | 1          |           |
|   | <b>TOTAL<br/>MAXIMUM<br/>SCORES(XY)</b> |  | <b>30</b>  | <b>14</b> |
|   |   |  | <b>41</b>  |           |

## **4.0 ATP- PART IV**

### **INFORMATION ON REVIEW PROCESS**

#### **4.1 Occupational Profile Reviewed (September 2020)**

The Occupational Profile was exclusively reviewed by job practitioners who were working in the Electronics Mechanic 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 Modules Review (September 2020)**

Based on the Occupational Profile for Electronics Mechanic 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 Electronics Mechanic 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 review philosophy.

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

#### 4.5 Reviewing Panel

The participating panel of Job Practitioners required for different stages of the Assessment and Training Package i.e., occupational profile, training modules, assessment instruments were constituted by members from the following organisations;

| No. | Name                         | Institution/ Organisation              |
|-----|------------------------------|--|
| 1.  | Mr. Kavuma Abubaker          | National Curriculum Development Centre |
| 2.  | Mr. Kyanda.Kasim             | Kasim Computer Centre-Mukono           |
| 3.  | Mr. Kakoby Swithin Jock      | Ecurei                                 |
| 4.  | Mr. Kizito Geoffery          | King's College Budo-Wakiso             |
| 5.  | Mr. Muhangi Ustas            | KCP-Mbarara                            |
| 6.  | Mr. Kizito. Samuel Makaabugo | Mpoma School –Mukono                   |
| 7.  | Mr. Kato Bruno               | Hive Technologies –Ishaka-Bushenyi     |
| 8.  | Mr. Muyige Bonney            | Allien Technologies –Kampala           |

#### 4.6 Facilitator team

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

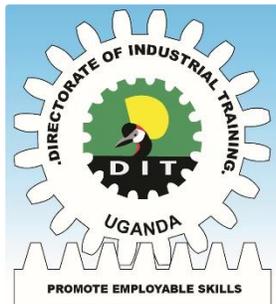
1. **Team Leader:** Ms. Mukyala Ruth, Ag Deputy Director, DIT
2. **Facilitators:** Ms. Ahimbisibwe Judith and Nakafero Suzan,
3. **DIT Data Entrant:** Mr. Mawata Grace, Mr. Obitre Ronald, Ms Eyoru Gladys Nicolette
4. **Compiled by:** Mr: Mawata Grace
5. **Edited by:** Ms. Mukyala Ruth Ag. DD, DIT, Qualification Standards Dept. DIT
6. **Coordinated by:** Mr Byakatonda Patrick, Ag. Director, DIT.

**4.7 Reference time:**

The Assessment and Training Package was compiled in September 2020 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

**References**

- Basic electronics by A Hassan 2017
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- Electronics book 1 electronics devices and circuit applications by Ernest MKIM and Thomas Shuber 2015.
- The Art of Electronics by Paul Horowitz and Winfield Hill 1989



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