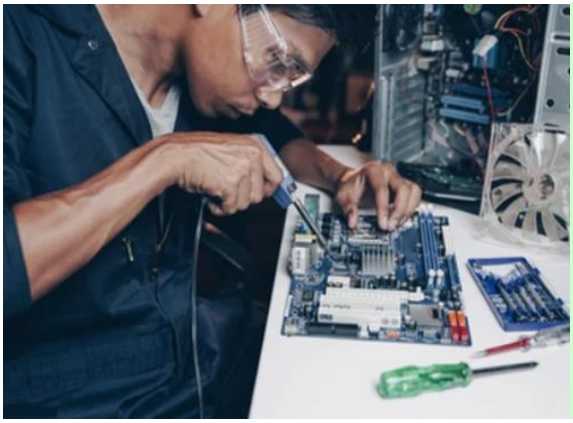
THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Business, Technical, Vocational Education and Training [BTVET] Sub sector Reform



Assessment and Training Package For COMPUTER TECHNICIAN

Qualification Level: 1
Occupational Cluster: Information Communication Technology

January 2022

Reviewed by:

Qualifications Standards Department
Directorate Of Industrial Training

Funded by:

Government of Uganda

DIRECTORATE OF INDUSTRIAL TRAINING

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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:

4.1 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.

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

4.3 The Certificates and Diplomas awarded under the Act shall be recognized 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) Harmonizing 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 organizes 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 Ministry of Education and Sports (MoES) through the Directorate of Industrial Training Conducts Competence Based Assessment.

The advantages of CBET include improved access, equity and relevance of BTVET, reduced unit costs of training, and recognition of Prior Learning (or on-the-job- training), among others.

As the Ministry executes its obligation of ensuring quality in training standards, the public-private partnership is being strengthened to improve occupational competence of the country's workforce without gender bias.

Further, efforts to link Education and Training to the real world of work, the Ministry through the BTVET department set up the Uganda Vocational Qualification Framework (UVQF) Secretariat in 2004 which was main-streamed into DIT in 2008 as the Qualifications Standards Department.

To achieve the set-out targets in the reform process, the Directorate embarked on the anticipated UVQF design and development piloting its instruments and mechanisms in order to effectively enhance Competence-Based Education and Training (CBET) in Uganda.

To date, the Qualifications Standards Department of DIT has produced Assessment and Training Packages (ATP) for various occupations. Each ATP contains 3 parts namely:

1. Occupational/job Profile
2. Training modules and
3. Assessment instruments Banks

The ATP 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 & Training Package (ATP)" for training, assessment and certification of **A COMPUTER TECHNCIAN-QUALIFICATION LEVEL I**

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

Ketty Lamaro
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 COMPUTER TECHNICIAN. This Occupational Profile, which was developed by Computer Technicians practicing in the world of work mirrors the duties, and tasks Tailors are expected to perform.

0.2. PART II: "Training Modules" in the form of guidelines to train **COMPUTER TECHNICIANS** both on the job as well as in training centers (or combinations of both venues of learning). The Training Modules herein have been developed 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 **COMPUTER TECHNICIAN**. These assessment-based instruments were developed by Job practitioners (Computer Technicians) based on the occupational profile and training modules.

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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 of time 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 centers as well as companies can accommodate more students in a given period of time.

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).

0.6. The parts of this Assessment and Training Package were sequentially developed as follows:

i Part 1: Occupational Profile: ***January 2022***
ii Part 2: Training Modules: ***January 2022***
iii Part 3: Assessment Instruments: ***January 2022***

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

Patrick Byakatonda

Ag. Director DIT

Acknowledgement

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

- 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;
- Art and Design 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
BTVET	Business, Technical and Vocational Education and Training
CBA	Competence Based Assessment
CBET	Competency Based Education and Training
DACUM	Develop a Curriculum
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 and Vocational Education and Training
UVQ	Uganda Vocational Qualification
UVQF	Uganda Vocational Qualifications Framework
WTI	Written (Theory) Test Item

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) competency is understood as the ability to perform tasks common to an occupation to a set standard.
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 LWA 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/behaviour, 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 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. *(see also: Duty)*

1.0 ATP-PART I
Occupational Profile for COMPUTER TECHNICIAN

1.1 The OCCUPATIONAL PROFILE (OP) for "**COMPUTER TECHNICIAN**" below defines the ***Duties*** and ***Tasks*** a competent **COMPUTER TECHNICIAN** 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 for **COMPUTER TECHNICIANs** are listed on the following page.

[1] The DACUM-method was used. DACUM is an acronym for 'Develop A Curriculum'

Expert Panel

Moses Tuhame
NCDC

Ggita Joseph
UNEB

Justus Mubangizi
Ntare School

Charles Kakaire
Busoga College Mwiri

Jimmy Kasozi
St. Mark's College Namagoma

Alfred Muligirwa
Uganda Revenue Authority

Silver Muhindo
Vision Group

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Benedict Muhwezi
Mulago Hospital

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Phenom Electrotech Uganda Ltd.

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Funded by
Government of Uganda

THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Business, Technical, Vocational Education and Training (BTVET) Sub sector Reform

Occupational Profile

For a

"COMPUTER TECHNICIAN"

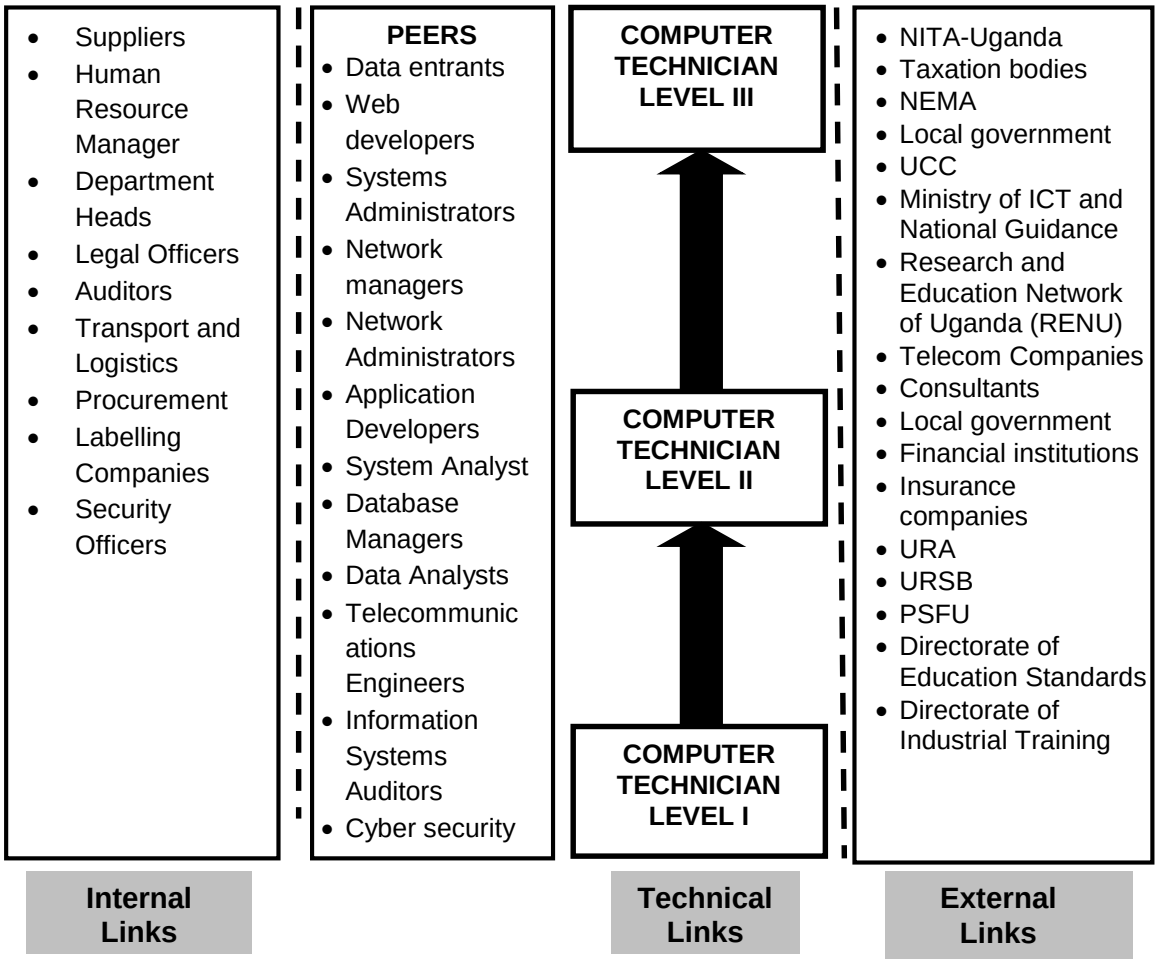
Reviewed by: Directorate of Industrial Training (Qualifications Standards)

Dates of workshop: 03rd January - 07th January 2022

NOMENCLATURE – COMPUTER TECHNICIAN

Definition: **A Computer Technician** is a person who installs, maintains and repairs computer hardware, software and network/internet issues.

JOB ORGANISATION CHART FOR A COMPUTER TECHNICIAN



Descriptions for the levels in the occupation of a Computer Technician

UVQ Level 1 Computer Technician: is a person who diagnoses and replaces faulty hardware components, installs and reinstalls corrupted software without losing data.

UVQ Level 1 Computer Technician: is a person who configures, troubleshoots and monitor functioning of computers, creates and maintains area networks.

UVQ Level 1 Computer Technician: is a person who replace, repair and maintain components in computer hardware and makes software recommendations.

Duties and Tasks

A. PLAN COMPUTER TECHNICIAN ENTERPRISE	**A1.** Carry out feasibility study	**A2.** Conduct user requirement surveys	**A3.** Prepare budget
	A4. Determine human capital	**A5.** Determine source of funding	**A6.** Determine work space
	A7. Prepare work schedules	**A8.** Determine materials, tools and equipment	**A9.** Prepare procurement plan
B. SET UP HARDWARE AND SOFTWARE SYSTEM	**B1.** Configure and Install software	**B2.** Install and deploy IT equipment	**B3.** Install and configure LAN and WAN
	B4. Setup peripheral devices	**B5.** Test hardware and software system	**B6.** Design network
C. MAINTAIN SOFTWARE AND HARDWARE	**C1.** Replace software and hardware	**C2.** Upgrade hardware components	**C3.** Update software
	C4. Manage computer peripheral equipment	**C5.** Manage computer and network security	**C6.** Perform regular check-ups perform system audits and tests
D. MANAGE FARM TOOLS, EQUIPMENT AND STRUCTURES	**D1.** Prepare maintenance schedule	**D2.** Service farm tools and equipment	**D3.** Repair/ replace equipment parts
	D4. Store tools and equipment	**D5.** Repair and maintain farm structures	**D6.** Keep inventory
E. PERFORM OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENTAL PROTECTION PRACTICES	**E1.** Sensitize workers	**E2.** Observe health and safety precautions	**E3.** Wear personal protective gear
	E4. Maintain hygiene and sanitation	**E5.** Administer first aid	**E6.** Perform fire fighting
	E7. Manage waste	**E8.** Display safety notices	**E9.** Use manuals

F. PERFORM ADMINISTRATIVE TASKS	**F1.** Mobilise resources	**F 2.** Recruit workers	**F 3.** Assign work
	F4. Prepare work schedule	**F5.** Train workers	**F6.** Supervise works
	F7. Appraise workers	**F8.** Attend meetings	**F9.** Advise clients
	F10. Prepare reports	**F11.** Mentor workers	**F12.** Manage conflicts
	F13. Collaborate with service providers	**F14.** Generate and keep records	**F15.** Remunerate workers
	F16. Pay bills	**F17.** Provide end-user support	**F18.** Insure Enterprise Keep inventory

G. PURSUE CONTINUOUS PROFESSIONAL DEVELOPMENT	**G1.** Network with peers	**G2.** Participate in seminars/ workshops	**G3.** Obtain membership in professional associations
	G4. Review trade publication	**G5.** Train users	**G6.** Benchmark with other organisations
	G7. Pursue further studies		

Additional Information

Generic Knowledge & Skills

1. Tools equipment and implement usage, operation and maintenance
2. Waste management
3. Safety, health and environmental practices and regulations
4. Environmental awareness
5. Quality control
6. Communication skills
7. Information and communication technology
8. Financial literacy
9. Problem solving
10. Numeracy and literacy skills
11. First aid administration
12. Team work and co-operation
13. Resource mobilisation and management
14. Entrepreneurship skills
15. Public relations
16. Troubleshooting guides
17. Time management
18. Types of transport
19. Staff training and mentoring skills
20. Manufacturers manuals
21. Record keeping
22. Quick reference guides
23. Repair journals
24. Business and customer service skills
25. Human resource management
26. Online computer manuals
27. A good eye for detail
28. Ergonomics
29. Technical websites
30. Transaction documents
31. Online forums and chats
32. Planning skills
33. Leadership skills
34. Innovative skills
35. Interpersonal relations
36. Marketing and processing
37. Risk management
38. Cyber security

Tools, Materials and Equipment

1. Tweezers
2. Hammer
3. Scrubbing brushes
4. Air blower
5. Hot air blower
6. Soldering gun
7. Soft cloth
8. Cable ties
9. Tester
10. First aid box kit
11. Star screw driver
12. Laptop
13. Flash disk
14. Pliers
15. Clipping tool
16. Cable tester
17. Multi meter
18. Motherboard manuals
19. ATX power supply
20. Post card
21. Data recovery software
22. USB network cable
23. Screw drivers (non-magnetic)
24. Anti-virus
25. External hard drive
26. Zip ties
27. Alcohol
28. Foam
29. Filers
30. Hand sanitizer
31. Cotton swabs
32. Water
33. Grounding strap
34. Computer vacuum/blowers
35. Portable DVD writer
36. Anti-spyware
37. HEX driver
38. Cable
39. Cable strippers
40. Cable benders
41. Firewalls
45. OS
42. MS office
43. Off shelf software

Attitudes/ Traits/ Behaviour

1. Self-motivated
2. Trustworthy
3. Honest
4. Tolerant
5. Hardworking
6. Team player
7. Disciplined
8. Good time manager
9. Committed
10. Good listener
11. Flexible
12. Result oriented
13. Curious
14. Competitive
15. Cooperative
16. Innovative and creative
17. Physically fit
18. Knowledgeable
19. Patient
20. Polite
21. Social
22. Vigilant
23. Calm
24. Respectful
25. Confident
26. Intelligent
27. Logical
28. Trainable
29. Tidy
30. Kind
31. Empathetic
32. Integrity
33. Healthy
34. Entrepreneur
35. Risk taker

Future Trends and Concerns

1. Self-criticism
2. Customer care
3. Bench marking with computer technicians in other countries
4. Computer literacy
5. Need for advanced technology
6. Open line of progression/ career Development
7. Poor extension services
8. Limited management skills
9. Severe climate changes
10. Limited processing industries
11. Government policy
12. Regional economic integration
13. Heavy competition from other sectors
14. Real estates
15. Production of alternative commodities
16. Insurance
17. Population increase
18. Political climate
19. Financial services
20. State of economy

2.0 ATP – PART II
Training Modules for a COMPUTER TECHNICIAN

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 COMPUTER TECHNICIAN to acquire job specific skills and knowledge (i.e., competencies) module by module. A single module can be accomplished within a relatively short duration of time 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 centers, as well as companies can accommodate more students in a given period of time.

2.3 The modules were developed jointly by both instructors 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.

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 an 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, at the workplace; or a combination of both.

WHO IS A COMPUTER TECHNICIAN QUALIFICATION LEVEL 1?

A level 1 Computer Technician is a person who diagnoses and replaces faulty hardware components, installs and reinstalls corrupted software without losing data.

OVERVIEW OF MODULES FOR A COMPUTER TECHNICIAN UVQ LEVEL 1

Code	Module Title	Average duration	
		Contact hours	Weeks
UE/CT/M1.1	Assemble computer system	80	2
UE/CT/M1.2	Maintain computer system	240	6
UE/CT/M1.4	Establish Computer Service Enterprise	80	2
Summary	**03 Training modules**	**400 Hours**	**10 Weeks**

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 leaner 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 for **Computer Technician**.

Code	UE/CT/M1.1
Module title	**M1.1: Assemble Computer System**
Related Qualification	Part of: Uganda Vocational Qualification (COMPUTER TECHNICIAN UVQ1)
Qualification Level	1
Module purpose	At the end of this module, the trainee should be able to assemble and disassemble computer system. Identify different components of a computer.
Learning-Working Assignments (LWAs)	**LWA1/1:** Assemble a system unit **LWA1/2:** Install operating system and application programs **LWA1/3:** Installation of other peripherals **LWA1/4:** Partition of hard ware **LWA1/5:** Perform occupational health, safety and environmental protection practices **Note:** *1. The learning exercises may be repeated till the trainee acquires a targeted competence.* 2. *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.*
Related Practical Exercises (PEXs)	**LWA1/1: Assemble a system unit** PEX 1.1: System casing PEX 1.2: Position motherboard PEX 1.3: Attach RAM to motherboard PEX 1.4: Attach CPU to motherboard PEX 1.5: Attach processor to motherboard PEX 1.6: Attach hard disk drive to motherboard PEX 1.7: Attach writers to motherboard PEX 1.8: Attach power supply to motherboard PEX 1.9: Close casing PEX 1.10: Connect the VGA to the monitor PEX 1.11: Power on the monitor
	LWA1/2: Install operating systems and application programs PEX 2/1: Set up the display environment PEX 2/2: Set up the BIOS PEX 2/3: Erase the primary boot disk PEX 2/4: Partition hard disk PEX 2/5: Load the boot files PEX 2/6: Update the drivers PEX 2/7: Run operating system updates PEX 2/8: Install applications and utilities

	LWA1/3: Installation of other peripherals PEX 3.1: Connect a peripheral device to a computer PEX 3.2: Check for drivers PEX 3.3: Install drivers PEX 3.4: Run a test PEX3.12: Service machinery
	LWA1/3: Perform occupational health, safety and environmental protection practices PEX 3/1: Wear personal protective gear PEX 3/2: Install lightning conductors PEX 3/4: Maintain general sanitation PEX 3/5: Restrict entry to farm with barriers PEX 3/6: Display safety signs PEX 3/7: Administer first aid PEX 3/8: Manage waste
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the related knowledge listings as well as in test items 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:* • Time Management Skills • Adaptability • Tenacity • Attention to Detail • Persuasiveness • Proactiveness
Average duration of learning	80 hours (10 days) of nominal learning suggested to include: • *3 days of occupational theory and* • *7 days of occupational practice*
Suggestions on organization of learning	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.
Assessment	Assessment to be conducted according to established regulations by recognised assessment body using related practical and written test items from Item bank
Minimum required tools/ equipment/ implements or equivalent	PPEs, solder, anti-static mat, blower, SMD, screw driver kit, brush, digital multimetre, magnifier glass, ATX Power Supply Tester, data-recovery software, HDD, flash disk, external HDD, flash disk, Tweezers, computer, filer, nozzle, twizer, pliers, cutter or blade, needle-nose pliers, wire cutters, wire strippers, crimpers

Minimum required materials and consumables or equivalent	cleaning cloth and form, solder paste, thermal paste, Water, thinner
Special notes	The theory must be integrated into the practice during delivery.

Code	**UE/CT/M1.2**
Module title	**M1.2: Maintain Computer System**
Related Qualification	Part of: Uganda Vocational Qualification (COMPUTER TECHNICIAN UVQ1)
Qualification Level	1
Module purpose	At the end of this module, the trainee should be able to perform computer system maintenance.
Learning-Working Assignments (LWAs)	**LWA2/1:** Repair and install operating system **LWA2/2:** Update drivers and software **LWA2/3:** Clean computer components and peripherals **LWA2/4:** Update drivers and software **LWA2/5:** Remote Desktop Support **LWA2/6:** Ensure computer security **LWA2/7:** Recover data **LWA2/8:** Perform occupational health, safety and environmental protection practices **Note:** 1. *The learning exercises may be repeated till the trainee acquires a targeted competence.* 2. *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.*
Related Practical Exercises (PEXs)	**LWA1/1: Repair and Install operating system** PEX 1.1: Assess the machine operating system prerequisites PEX 1.2: Create a bootable disk/flash-disk of a desired operating system putting in consideration of the file system PEX 1.3: Load boot files PEX 1.4: Identify the missing drivers and update them PEX 1.5: Install the anti-virus PEX 1.6: Install basic application PEX 1.7: Retrieve data PEX 1.8: Test and deploy the system
	LWA1/2: Update drivers and software PEX 2.1: Identify the missing drivers PEX 2.2: Select software update PEX 2.3: Install software update PEX 2.4: Install the anti-virus PEX 2.5: Test software
	LWA1/3: Clean computer components and peripherals PEX 3.1: Identify the tools and equipment PEX 3.2: Disassemble computer/device PEX 3.3: Clean RAM slot PEX 3.4: Clean Fan PEX 3.5: Clean HDD PEX 3.6: Clean Motherboard PEX 3.7: Clean power supply

	PEX 3.8: Assemble computer PEX 3.9: Clean assembled peripherals PEX 3.10: Test computer functionality
	LWA2/4: Recover Data PEX 4.1: Identify the right recovery tools PEX 4.2: Install recovery tools PEX 4.3: Perform Data recovery PEX 4.4: Save recovered data PEX 4.5: Test
	LWA2/5: Remote Desktop Support PEX 5.1: Identify the right remote applications PEX 5.2: Configure computer PEX 5.3: Test communication links PEX 5.4: Carryout support
	LWA2/6: Ensure computer security PEX 6.1: Protect computer system from power surges PEX 6.2: Conduct fire drills PEX 6.3: Replace worn out hardware parts PEX 6.4: Perform system updates PEX 6.5: Install anti-viruses PEX 6.6: Perform data backup PEX 6.7: Enable firewalls
	LWA2/7: Perform occupational health, safety and environmental protection practices PEX 7.1: Grounding while working on a machine PEX 7.2: Wear personal protective gear PEX 7.3: Display safety signs PEX 7.4: Administer first aid PEX 7.5: Manage waste
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the related knowledge listings as well as in test items should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	

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:* • Ensure data privacy, protection and integrity • Know other operating systems • Functionality of computer components • Purpose of computer maintenance • Setting up computer peripherals • Setting up computer peripherals • configuring computer peripherals • Know how to soldier and unsolder • Differentiating between system software, utility software and application software
Average duration of learning	240 hours (30 days) of nominal learning suggested to include: • *10 days of occupational theory and* • *20 days of occupational practice*
Suggestions on organization of learning	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.
Assessment	Assessment to be conducted according to established regulations by recognised assessment body using related practical and written test items from Item bank
Minimum required tools/ equipment/ implements or equivalent	PPEs, solder, anti-static mat, blower, SMD, screw driver kit, brush, digital multimetre, magnifier glass, ATX Power Supply Tester, data-recovery software, HDD, flash disk, external HDD, flash disk, Tweezers, computer, filer, nozzle, twizer, pliers, cutter or blade, needle-nose pliers, wire cutters, wire strippers, crimpers
Minimum required materials and consumables or equivalent	cleaning cloth and form, solder paste, thermal paste, Water, thinner
Special notes	

Code	UE/CT/M1.3
Module title	**M1.3: Establish Computer Service Enterprise**
Related Qualification	Part of: Uganda Vocational Qualification (COMPUTER TECHNICIAN UVQ1)
Qualification Level	1
Module purpose	By the end of this module, the trainee will be able to start-up and manage a computer service business
Learning-Working Assignments (LWAs)	**LWA 4/1:** Develop a business plan **LWA 4/2:** Market computer services **LWA 4/3:** Perform administrative tasks **LWA 4/4:** Occupational health safety and environmental protection practices ***Note:*** 1 *The learning exercises may be repeated till the trainee acquires a targeted competence.* 2 *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.*
Related Practical Exercises (PEXs)	**LWA4/1: Develop a business plan** PEX 1.1: Carryout market survey PEX 1.2: Prepare budget PEX 1.3: Prepare production plan PEX 1.4: Prepare marketing plan PEX 1.5: Mobilise resources PEX 1.6: Prepare procurement plan PEX 1.7: Prepare work schedule PEX 1.6: Prepare enterprise structural layout PEX 1.6: Determine business location
	LWA4/2: Set up business PEX 1.1: Legalise business PEX 1.2: Secure workshop PEX 1.3: Procure tools, equipment and materials PEX 1.4: Install infrastructure PEX 1.5: Manage business
	LWA4/3: Market computer services PEX 2.1: Promote computer services PEX 2.2: Price computer services PEX 2.3: Sell computer services PEX 2.4: Offer after sell services PEX 2.5: Communicate with clients
	LWA4/4: Perform administrative tasks PEX 3.1: Draft ICT guidelines PEX 3.2: Manage finances PEX 3.3: Manage human resources PEX 3.4: Communicate with stakeholders PEX 3.5: Engage in corporate social responsibilities

	LWA4/6: Occupational health safety and environmental protection practices PEX 6.1: Wear personal protective gear PEX 6.2: Observe personal hygiene and sanitation PEX 6.3: Display safety signs PEX 6.4: Administer first aid PEX 6.5: Manage waste
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:* • Usage of tools and materials • Planning • Human resource management • Measurements • Mathematical competencies • ICT • Networking • Regulations and policies • Transportation • Security • Storage • Record keeping • Regulations and policies • Human resource management • Financial management • Procurement planning • Waste management • First aid administration • Usage tool and materials
Average duration of learning	80 hours (10 days) of nominal learning suggested to include • *3days of occupational theory and* • *7 days of occupational practice*
Suggestions on organization of learning	The acquisition of competencies (skills. Knowledge, attitudes) described in this module may take place at a training centre/ farm or its equivalent provided all equipment and materials required for training are in place.
Assessment	Assessment to be conducted according to established regulations by recognised assessment body using related practical and written test items from Item bank

Minimum required tools/ equipment/ implements or equivalent	Calculator, cell phone/telephone set, stamp, computer, printer, photocopier, cabins, pigeon-holes, shelves, toolbox, power source
Minimum required materials and consumables or equivalent	Pens, pencils, papers, rulers, fliers, brochures, banners, posters, business cards, receipt book, invoice, books of records, preformer invoice, delivery note, stickers, signpost
Special notes	

ATP- PART III
Assessment Instruments for COMPUTER TECHNICIAN

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 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 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 **COMPUTER TECHNICIAN** are included. A larger selection of test items can be obtained as electronic or printed copies from designated outlets.

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	1
3.	Written (Theory)- Matching item – (Cause-effect)	2
4.	Written (Theory)- Matching item – (Work sequence)	1
5.	Performance (Practical) Test Items	2
	Total	**08**

WRITTEN TEST ITEMS (SAMPLES)

<table>
<tr><th>DIT/ QS</th><th colspan="4">Test Item Database
Written (Theory) Test Item- No. 1</th></tr>
<tr><td>Occupational Title:</td><td colspan="4">COMPUTER TECHNICIAN</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">C1</td></tr>
<tr><td>Date of OP:</td><td colspan="4">January, 2022</td></tr>
<tr><td>Related module:</td><td colspan="4"></td></tr>
<tr><td>Time allocation:</td><td colspan="4">3 minutes</td></tr>
</table>

Test Item	Why should you perform computer maintenance activities?
Answer spaces	1. …… 2. ……... 3. ……
Expected key (answers)	1. Improve functionality of a computer. 2. Lengthen the lifespan of a computer 3. Help you browse the web more safely

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 2			
Occupational Title:	COMPUTER TECHNICIAN			
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:	January, 2022			
Related module:				
Time allocation:	2minutes			

Test Item	What is the significance of the triangle on a CPU slot?
Answer spaces	1. ……
Key (answer)	1. To align processor

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 3			
Occupational Title:	COMPUTER TECHNICIAN			
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:	January, 2022			
Related module:				
Time allocation:	2 minutes			

Test Item	For what purpose is rebooting done after changing display settings?
Answer spaces	A. To activate the loaded drivers. B. To make the computer strong C. To make the computer brighter D. To activate the graphic card.

Key (answer)	A. To activate the loaded drivers.

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 4
Occupational Title:	COMPUTER TECHNICIAN
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:	January, 2022
Related module:	
Time allocation:	5 minutes

Test item	Match **appropriate** type of software recommended for the service of each of the following people.

Column A (diseases)	
1.	Graphics Designer
2.	Secretary
3.	Architect
4.	Data analyst

Column B (causes)	
A.	Photoshop
B.	Ms Word
C.	AutoCAD
D.	Spreadsheet
E.	Moodle
F.	Solitaire
G.	JavaScript
H.	Android

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

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 5
Occupational Title:	COMPUTER TECHNICIAN
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:	January, 2022
Related module:	
Time allocation:	3mins

Test item	Match the computer terms to their Examples

	Column A (diseases)
1.	Operating System
2.	Application Software
3.	Partitioning

	Column B (remedies)
A.	Windows 7,8,10
B.	RAM
C.	Office 2003,2016
D.	Hard disk
E.	CPU

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

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 6			
Occupational Title:	COMPUTER TECHNICIAN			
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:	January, 2022			
Related modules:				
Time allocation:	5 minutes			

Test Item	Arrange the steps followed in correcting the error message- **NO OPERATING SYSTEM FOUND** during system start-up.

Column A (chronology)	**Column B (work steps) in wrong chronology order**	
1.	A	Identify Hardware problem
2.	B	Check boot sequence
3.	C	Check Damaged boot loader
4.	D	Change unit settings
5.	E	check software update

Key (answer)	1: B; 2: D; 3: C; 4: A

PERFORMANCE TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Performance Test Item- No. 8
Occupational Title:	Computer Technician
Competence level:	1
Code no.	
Test Item:	Install Office 2010
Complexity level:	P2
Date of OP:	January, 2022
Related modules:	
Related skills and knowledge:	• Hardware specifications • Types of software • Types of operating systems • Types of storage • Types of installation media • File Management
Required tools, Materials and Equipment:	Internet connection, computer, storage disks, installation media (CD, DVD, flash disks etc.), installation rights, software updates.
Time allocation:	3hrs
Preferred venue:	ICT Laboratory
Remarks for candidates	Candidates must identify themselves.
Remarks for assessors	Provide all the necessary tools, equipment and materials.

#	Assessment criteria	Scoring guide	Max Score	
			Process	Result
1	**Preparation before task**	Setup work area		2
		Connected computer to power source	2	
		No loose connection observed		1
		Powered on computer	2	
		LED indicators observed		1
2	**Evaluated hardware requirements for the software**	Checked network connectivity	2	
		Checked storage capacity	2	
		Checked operating system compatibility	2	
		Checked system memory	2	
		Checked processor speed	2	
		Compatibility confirmed		3
3	**Located/downloaded software files**	Appropriate installation media selected	1	
		Installation media connected to the computer	1	
		Installation files saved in an appropriate location	2	
		Files confirmed in the appropriate location		2
4	**Located executable file**	Setup file identified	1	
		Setup file run	1	
		Installation initiation confirmed		1
5	**Run Installation**	identified Dialog box instructions	1	
		followed Dialog box instructions	1	
		completed Installation process		2
6	**Tested software**	Office 2010 installation confirmed	1	
		Office 2010 application launched	1	
		Office 2010 application interface appeared		2
	TOTAL (y)	**(Process + Results)**	**24**	**14**
	Maximum score	$\frac{x}{y}$ **x 100**	$\frac{X}{38}$ **x 100**	

4.0 ATP- PART IV
INFORMATION ON REVIEWED PROCESS

4.1 Occupational Profile Development (January 2022)

The assessment and Training Package was exclusively developed by job practitioners who were working in the occupation of **Computer Technician.**
The job expert panel, guided by UVQF facilitators developed the Occupational Profile that mirrors duties and tasks performed in the world of work and also provided additional generic information regarding the occupation.

4.2 Training Modules Development (January 2022)

Based on the Occupational Profile for Computer Technician of **January 2022**, Training Modules were developed by job practitioners, guided by UVQF Facilitators.

4.3 Test Item Development (January 2022)

Based on the Occupational Profile for Computer Technician of **January 2022**, and Training Modules, Test Items were developed 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 Developing Panel

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

No.	Name	Institution/ Organization
1.	Justus Mubangizi	Ntare School
2.	Charles Kakaire	Busoga College Mwiri
3.	Jimmy Kasozi	St. Mark's College Namagoma
4.	Alfred Muligirwa	Uganda Revenue Authority
5.	Silver Muhindo	Vision Group
6.	Edgar Tusiime	Innovis Telecommunication Services Ltd.
7.	Benedict Muhwezi	Mulago Hospital
8.	Ssekyanzi Grace Edwards	Phenom Electrotech Uganda Ltd.
9.	Moses Bukenya	IPLink Consults Ltd

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 (Occupational Profile Development) -**Kibira Benjamin Alex & Roland Ganafa
3. **Facilitators (Training Modules Development) -** Kibira Benjamin Alex & Roland Ganafa
4. **Facilitators (Test Item Development) -** Kibira Benjamin Alex & Roland Ganafa
5. **Compiled** by Mr. Taremwa Yehu, Mr. Masolo Joshua Solomon Data Entrants, DIT
6. **Edited** by Ms. Mukyala Ruth Ag. DD, DIT, Qualification Standards Dept. DIT
7. **Coordinated** by – Mr Byakatonda Patrick, Ag. Director, DIT;

4.7 Reference time:

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

- ICT Essential for Secondary Schools & Tertiary Institutions by Barbara Kayondo, 2017
- Elisabeth Robson and Eric Freeman (2012). Head First HTML and CSS. A Brain-friendly Guide. O'Reilly. Second Edition. Beijing. Cabridge, Famham, Koln, Sebastopol, Tokyo