THE REPUBLIC OF UGANDA
Ministry of Education and Sports

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

Assessment and Training Package

For

MOBILE APPLICATIONS DEVELOPER

Qualification Level: 1

Occupational Cluster: Information, Communication and Technology

January 2022

Reviewed by:

Qualifications Standards Department
Directorate Of Industrial Training

Funded by:

Government of Uganda

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) 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 and
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 foreseen advantages of CBA include improved access, equity and relevance of skills development, 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.

To achieve the setout targets, the Directorate embarked on the anticipated UVQF design and development piloting its instruments and mechanisms in order to effectively enhance Competence-Based Assessment (CBA) 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 **MOBILE APPLICATION DEVELOPER – QUALIFICATION LEVEL 1**.

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 MOBILE APPLICATION DEVELOPER.** This Occupational Profile, which was developed by Mobile Application Developers practicing in the world of work mirrors the duties, and tasks Mobile Application Developers are expected to perform.

0.2. **PART II: "Training Modules"** in the form of guidelines to train **MOBILE APPLICATION DEVELOPERs** 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 **MOBILE APPLICATION DEVELOPER**. These assessment-based instruments were developed by Job practitioners (Mobile Application Developers) 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 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.

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 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 development 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
SDD	Software Design Document
SRS	Software Requirements Specification
DBMS	Database Management System
APP	Application

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 MOBILE APPLICATIONS DEVELOPER

1.1 The OCCUPATIONAL PROFILE (OP) for "**MOBILE APPLICATION DEVELOPER**" below defines the ***Duties*** and ***Tasks*** a competent **MOBILE APPLICATIONS DEVELOPER** 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 **MOBILE APPLICATIONS DEVELOPER** are listed on the following page.

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

Expert Panel

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NCDC

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Kyambogo College School

Mudawa Charles
Mwiri College Busoga

Mubangizi Justus
Ntare School

Kibirige Richard
St. Henry's College Kitovu

Mukulu Robert
Namilyango College

Allan Lule
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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

"MOBILE APPLICATIONS DEVELOPMENT"

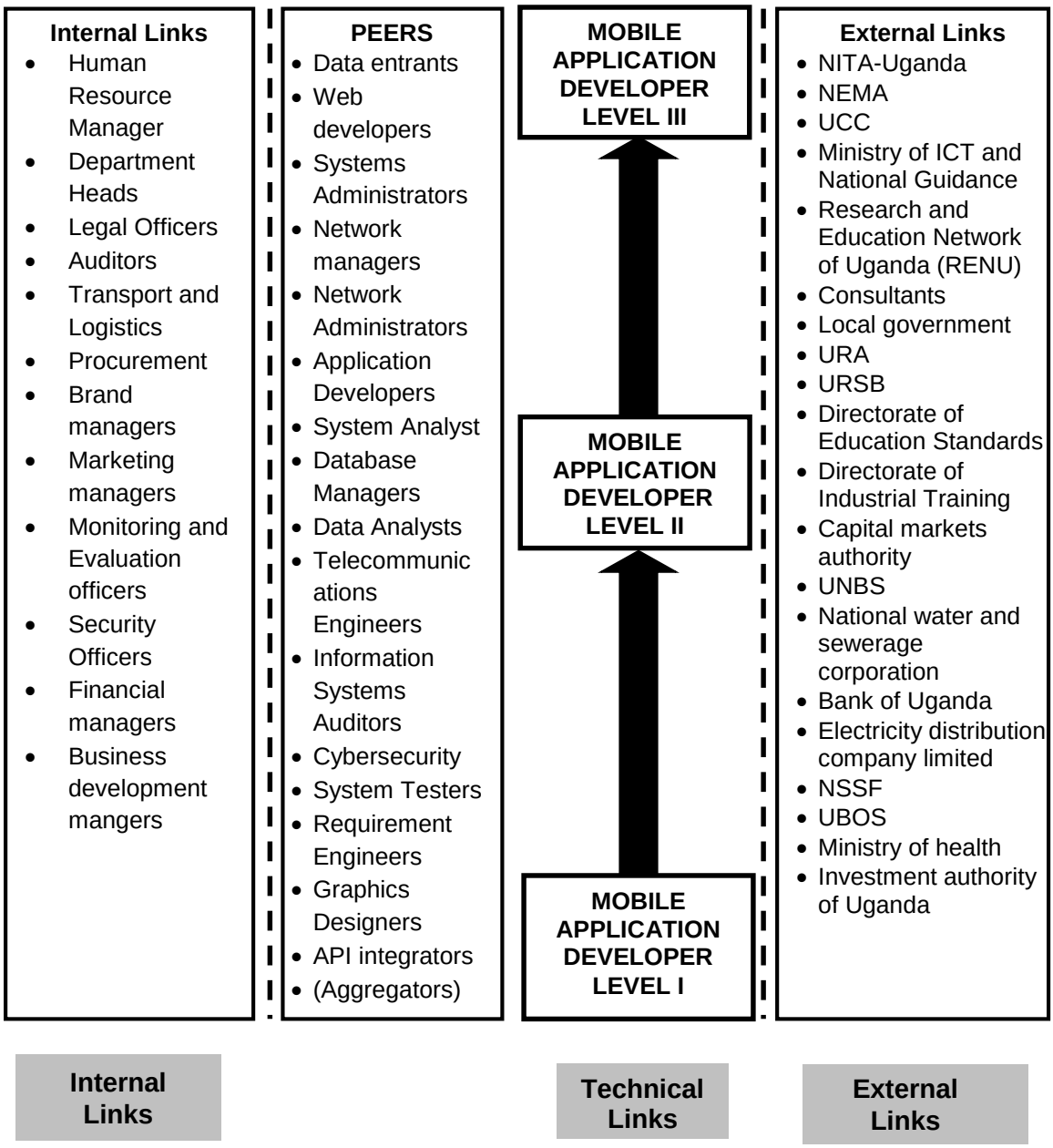
Reviewed by: Directorate of Industrial Training (Qualifications Standards)

Dates of workshop: 10rd January - 14th January 2022

NOMENCLATURE FOR THE OCCUPATION MOBILE APPLICATIONS DEVELOPER

Definition: **A MOBILE APPLICATIONS DEVELOPER** is a software developer that designs, develops, deploys and maintains applications that run on mobile devices.

JOB ORGANISATION CHART FOR A MOBILE APPLICATIONS DEVELOPER



UVQ Level I MOBILE APPLICATION DEVELOPER; is a person who analyses and specifies requirements to design, develop, update and test prototype of a mobile applications.

UVQ Level II MOBILE APPLICATION DEVELOPER; is a person who can analyse and specify requirements to develop, deploy, test and can maintain a mobile application.

UVQ Level III MOBILE APPLICATION DEVELOPER; is a person who can implement and manage the processes of analysing and specifying requirements, developing, testing, deploying and a maintaining mobile application.

Duties and Tasks

A. PLAN MOBILE APPLICATION DEVELOPMENT PROJECT	**A1.** Carryout feasibility study	**A2.** Develop a Work plan	**A3.** Cost Project
	A4. Develop Monitoring and Evaluation framework	**A5.** Manage Risks	**A6.** Draft contracts

B. DEVELOP MOBILE APPLICATIONS PROJECT REQUIREMENTS	**B1.** Identify Requirements	**B2.** Analyse Requirements	**B3.** Specify Requirements
	B4. Verify and Validate Requirements	**B5.** Signoff Requirements	**B6.** Manage Requirements

C. DESIGN MOBILE APPLICATION	**C1.** Review the user requirements	**C2.** Design specification document	**C3.** Develop use cases
	C4. Design Application architecture	**C5.** Design application logic	**C6.** Design User Interfaces and User experiences
	C7. Develop Prototypes	**C8.** Review prototypes	

D. DEVELOP THE MOBILE APPLICATION	**D1.** Identify platform	**D2.** Develop security procedures	**D3.** Install development environment
	D4. Setup a developer collaboration environment	**D5.** Develop Application logic	**D6.** Develop database
	D7. Develop API	**D8.** Develop User interface	**D9.** Integrate application components

E. TEST THE MOBILE APPLICATION	**E1.** Configure application test environment	**E2.** Perform security tests	**E3.** Perform Component testing
	E4. Perform Integration testing	**E5.** Simulate Application	**E6.** Perform User acceptance testing
	E7. Fix bugs	**E8.** Perform Quality control and assurance	

F. DEPLOY THE MOBILE APPLICATION	**F1.** Create developer account	**F2.**Review developer account policies.	**F3.** Upload and review application
	F4. Perform application testing	**F5.** Perform version control	**F6.** Develop user manual
	F7. Launch the application		

G. MAINTAIN AND EVOLVE THE MOBILE APPLICATION	**G1.** Setup analytic tools	**G2.** Monitor application performance	**G3.** Review changes in hardware, software and platforms
	G4. Review user feedback	**G5.** Identify bugs and errors	**G6.** Review emerging trends
	G7. Develop application updates	**G8.** Update the application	**G9.** Launch updates

H. PERFORM OCCUPATIONAL HEALTH, SAFETY, AND ENVIRONMENTAL PROTECTION PRACTICES	H1. Draft safety documents	H2. Signoff safety documents	H3. Manage work ethics
	H4. Perform fire fighting	**H5.** Administer first aid.	**H7.** Display safety signs
	H8. Manage waste	**H9.** Sensitize workers an key health issues	

I. PERFORM ADMINISTRATIVE TASKS	**I1.** Register business	**I2.** Setup office structure	**I3.** Define operations and policies
	I4. Procure tools, equipment and materials	**I5.** Manage meetings	**I6.** Brand and Market application
	I7. Review licences	**I8.** Manage Finances	**I9.** Communicate with stake holders
	I10. Recruit workers	**I11.** Remunerate workers	**I12.** Orient workers
	I13. Assign work	**I14.** Manage worker's discipline	**I15.** Motivate workers
	I16. Appraise workers		

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
39. Legal knowledge

Tools, Materials and Equipment

1. Scrubbing brushes
2. Hot air blower
3. Soldering gun
4. Cable ties
5. Tester
6. First aid box kit
7. Screw drivers
8. Computers
9. Flash disk
10. Pliers
11. Clipping tool
12. Cable tester
13. Multi meter
14. Motherboard manuals
15. ATX power supply
16. USB network cable
17. Screw drivers (non-magnetic)
18. Suggestion box
19. Web servers
20. Mobile App stores
21. Smart phones
22. White boards
23. Stationery
24. Anti-virus
25. External hard drive
26. Zip ties
27. Foam cleaner
28. Filers
29. Hand sanitizer
30. Water
31. Grounding strap
32. Computer vacuum/blowers
33. Portable DVD writer
34. Anti-spyware
35. HEX driver
36. Cables
37. Cable strippers
38. Cable benders
39. Firewalls
45. OS
40. Internet
41. Off shelf software
42. IDE
43. UPS
44. Backup generators
45. Conferencing tools

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
36. Notice period observation
37. ignorance

Future Trends and Concerns

1. Self-criticism
2. Customer care
3. Computer literacy
4. Open line of progression/ career development
5. Poor extension services
6. Limited management skills
7. Climate changes
8. Government policy
9. Establishment of new pasture techniques
10. Regional economic integration
11. Heavy competition from other sectors
12. Production of alternative commodities
13. Insurance
14. Population increase
15. Political climate
16. Financial services
17. State of economy
18. Cloud computing
19. IOT
20. Wearable devices
21. AI and machine learning
22. Block chain
23. Theory of change
24. Infrastructure changes
25. Collaboration technologies

2.0 ATP – PART II

Training Modules for MOBILE APPLICATIONS DEVELOPER

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 the Mobile Applications Developer 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 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 MOBILE APPLICATIONS DEVELOPER QUALIFICATION LEVEL 1?

A level 1 MOBILE APPLICATION DEVELOPER is a software developer that designs, develops, deploys and maintains applications that run on mobile devices.

OVERVIEW OF MODULES FOR A MOBILE APPLICATIONS DEVELOPER UVQ LEVEL 1

Code	Module Title	Average duration	
		Contact hours	Weeks
UE/MAD/M1.1	Conduct mobile application development planning	120	3
UE/MAD/M1.2	Determine mobile application requirements(SRS)	40	1
UE/MAD/M1.3	Design Mobile application(Design document and Prototype)	80	2
UE/MAD/M1.4	Develop mobile application	320	8
UE/MAD/M1.5	Test the mobile application(UAT Document sign offs)	200	5
UE/MAD/M1.6	Maintain mobile applications	200	5
UE/MAD/M1.7	Develop a mobile applications business	240	6
Summary	**07 Training modules**	**1200 Hours**	**30 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 **MOBILE APPLICATIONS DEVELOPER.**

Code	UE/MAD/M1.1
Module title	**M1.1: Conduct mobile application development planning**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATIONS DEVELOPER UVQ1)
Qualification Level	1
Module purpose	At the end of this module, the trainee should be able to plan and manage a Mobile application project
Learning-Working Assignments (LWAs)	**LWA1/1: Conduct a feasibility study** **LWA1/2: Develop a Work plan** **LWA1/3: Project costing** **LWA1/4: Plan Monitor and evaluate project** **LWA1/5: Manage project risks** **LWA1/6: 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: Conduct a feasibility study** PEX 1.1: Derive a problem statement PEX 1.2: Collect and analyse project requirements PEX 1.3: Develop a concept paper PEX 1.4: Draft a technical feasibility report PEX 1.5: Draft a financial feasibility report PEX 1.6: Draft a market feasibility report PEX 1.7: Compile and publish a feasibility study report

	LWA1/2: Develop a Workplan PEX 2/1: Identify project goals and activities PEX 2/2: Identify project activity inputs and outputs PEX 2/3: Determine activity Schedules PEX 2/4: Cost project activities and resources PEX 2/5: Identify potential obstacles PEX 2/6: Draft a workplan PEX 2/7: Evaluate and Approve workplan
	LWA1/3: Project costing PEX 3.1: Review financial feasibility report and workplan PEX 3.2: Identify activity inputs and resources PEX 3.3: Determine units cost and measure of each activity PEX 3.4: Cost the project PEX 3.5: Prepare budget PEX 3.6: Prepare a financial proposal
	LWA1/4: Plan Monitor and evaluate project PEX 4.1: Review project work plan PEX 4.2: Set project targets and indicators PEX 4.3: Determine Monitoring and evaluation methodology PEX 4.4: Write an M&E plan
	LWA1/5: Manage project risks PEX 5.1: Identify and assess project Goals PEX 5.2: Assess and specify project risks PEX 5.3: Establish risk management framework PEX 5.4: Analyse risks PEX 5.5: Develop risk remedies PEX 5.6: Write a project risks management report
	LWA1/6: Perform occupational health, safety and environmental protection practices PEX 6/1: Develop a work safety manual PEX 6/2: Train employees on safety PEX 6/4: Wear personal protective gear PEX 6/5: Restrict entry to firm with barriers PEX 6/6: Display safety signs PEX 6/7: Administer first aid PEX 6/8: Manage waste PEX 6/9: Perform fire fighting

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:* • Knowledge on application software • Knowledge on computer components • Knowledge on data collection tools • Knowledge on the use of data analysis tools • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on budgeting • Knowledge on team management • Knowledge on collaboration tools • Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on problem solving
Average duration of learning	120 hours (15 days) of nominal learning suggested to include: • *5 days of occupational theory and* • *10 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, blower, screw driver kit, data-recovery software, HDD, flash disk, computer, Off shelf software, Recorders, Camera, White board, Projector, Gumboots, Gloves, Cloud storage, Work Identification.
Minimum required materials and consumables or equivalent	Stationery, Face masks, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards, Introductory letters, Registration sheets.
Special notes	The theory must be integrated into the practice during delivery.

Code	UE/MAD/M1.2
Module title	**M1.2: Determine mobile application requirements**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATION DEVELOPER UVQ1)
Qualification Level	1
Module purpose	At the end of this module, the trainee should be able to determine Mobile Application requirements
Learning-Working Assignments (LWAs)	**LWA2/1: Analyse and specify Requirements** **LWA2/2: Verify and validate Requirements** **LWA2/3: Manage Requirements** **LWA2/4: 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)	**LWA2/1: Analyse and specify Requirements** PEX 1.1: Establish requirements collection methods PEX 1.2: Perform requirements collection PEX 1.3: Analyze and specify requirements PEX 1.4: Draft the requirements specification document
	LWA2/2: Verify and validate Requirements PEX 2.1: Establish a requirements verification process PEX 2.2: Rank application requirements PEX 2.3: Establish design inputs and output requirements PEX 2.4: Evaluate and validate user requirements PEX 2.5: Update the Requirements specification document PEX 2.6: Write a requirements agreement
	LWA2/3: Manage Requirements PEX 3.1: Develop a requirements matrix PEX 3.2: Update requirements PEX 3.3: Report requirements changes

	LWA2/4: Perform occupational health, safety and environmental protection practices PEX 4/1: Develop a work safety manual PEX 4/2: Train employees on safety PEX 4/4: Wear personal protective gear PEX 4/5: Restrict entry to firm with barriers PEX 4/6: Display safety signs PEX 4/7: Administer first aid PEX 4/8: Manage waste PEX 4/9: Perform fire fighting
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:* • Knowledge on application software • Knowledge on computer components • Knowledge on data collection tools • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on budgeting • Knowledge on team management • Knowledge on collaboration tools • Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on problem solving • Knowledge on requirement elicitation • Knowledge on record keeping
Average duration of learning	40 hours (5 days) of nominal learning suggested to include: • *2 days of occupational theory and* • *3 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, blower, data-recovery software, HDD, flash disk, computer, Off shelf software, White board, Projector, Gumboots, Bag, Cloud storage, Work Identification.
Minimum required materials and consumables or equivalent	Stationery, Face masks, Gloves, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards, Introductory letters, Registration sheets.
Special notes	

Code	UE/MAD/M1.3
Module title	**M1.3: Design Mobile application**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATION DEVELOPER UVQ1)
Qualification Level	1
Module purpose	By the end of this module, the trainee should be able to design a mobile application.
Learning-Working Assignments (LWAs)	**LWA3/1: Review the application requirements specification** **LWA3/2: Model application components** **LWA3/3: Design application Architecture** **LWA3/4: Design application Database** **LWA3/5: Design user interfaces and user experiences** **LWA3/6: Develop application Prototype** **LWA3/7: Occupational health safety and environmental protection practices** ***Note:*** 1 *The learning exercises may be repeated until 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)	**LWA3/1: Review the application requirements specification** PEX 1.1: Identify design requirements PEX 1.2: Write the application design document
	LWA3/2: Model application components PEX 2.1: Develop use case designs PEX 2.2: Develop application components PEX 2.3: Update the application design document
	LWA3/3: Design application Architecture PEX 3.1: Develop a component design PEX 3.2: Design application architecture PEX 3.3: Develop application dataflow design PEX 3.4: Update application design document

	LWA3/4: Design application Database PEX 4.1: Review the application design document PEX 4.2: Develop application database entity relationship model PEX 4.3: Update the application design document
	LWA3/5: Design user interfaces and user experiences PEX 5.1: Identify application user stories PEX 5.2: Create application wireframes and sketches PEX 5.3: Create application user interfaces PEX 5.4: Update the application design document
	LWA3/6: Develop application Prototype PEX 6.1: Review application specification documents PEX 6.2: Setup environment PEX 6.3: Create and simulate application prototype
	LWA3/7: Occupational health safety and environmental protection practices PEX 7/1: Develop a work safety manual PEX 7/2: Train employees on safety PEX 7/4: Wear personal protective gear PEX 7/5: Restrict entry to firm with barriers PEX 7/6: Display safety signs PEX 7/7: Administer first aid PEX 7/8: 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:* • Knowledge on application software • Knowledge on computer components • Knowledge on data collection tools • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on budgeting • Knowledge on team management • Knowledge on collaboration tools • Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on DBMS • Knowledge on normalization • Knowledge on problem solving • Knowledge on requirement elicitation • Knowledge on usage of tools and materials • Knowledge on Planning • Knowledge on design principles and standards
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/ 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	PPEs, blower, data-recovery software, HDD, flash disk, computer, Off shelf software, White board, Projector, Bag, Cloud storage, Work Identification.
Minimum required materials and consumables or equivalent	Stationery, Face masks, Gloves, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards, Introductory letters, Registration sheets.
Special notes	

Code	UE/MAD/M1.4
Module title	**M1.4: Develop mobile application**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATION DEVELOPER UVQ1)
Qualification Level	1
Module purpose	By the end of this module, the trainee should be able to develop a mobile application.
Learning-Working Assignments (LWAs)	**LWA4/1: Identify Development Platforms** **LWA4/2: Establish Security procedures** **LWA4/3: Setup Development and collaboration environments** **LWA4/4: Develop application logic** **LWA4/5: Develop Database** **LWA4/6: Develop API** **LWA4/7: Develop UI** **LWA4/8: Integrate App** **LWA4/9: Occupational health safety and environmental protection practices** ***Note:*** 3 *The learning exercises may be repeated till the trainee acquires a targeted competence.* 4 *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: Determine Development Platforms** PEX 1.1: Review SRS and SDD PEX 1.2: Determine hardware and software development Platform requirements PEX 1.3: Update SDD
	LWA4/2: Secure application PEX 2.1: Review SRS and SDD PEX 2.2: Determine security protocols PEX 2.3: Establish security protocols PEX 2.4: Write a security standards manual PEX 2.5: Review the Security standards manual PEX 2.6: Update SDD

	LWA4/3: Setup Development and collaboration environments PEX 3.1: Review the SRS and SDD PEX 3.2: Determine and setup application development tools PEX 3.3: Test the development environments
	LWA4/4: Develop application logic PEX 4.1: Review the SRS and SDD PEX 4.2: Determine application modules PEX 4.3: Determine programming language PEX 4.4: Write application functional logic (pseudo code, Design patterns) PEX 4.5: Update SDD
	LWA4/5: Develop Database PEX 5.1: Review SDD PEX 5.2: Determine database technologies PEX 5.3: Setup database development environments PEX 5.4: Design application database PEX 5.5: Test application database PEX 5.6: Update SDD
	LWA4/6: Develop API PEX 6.1: Review SDD, and SRS PEX 6.2: Determine programming language PEX 6.3: Setup and Configure the development environment PEX 6.4: Create API'S PEX 6.5: Test API's PEX 6.6: Review API's PEX 6.7: Update SDD
	LWA4/7: Develop UIs PEX 7.1: Review SRS, SDD, and developer Policies PEX 7.2: Determine programming language PEX 7.3: Setup and Configure the development environment PEX 7.4: Create UIs and navigations PEX 7.5: Test UIs PEX 7.6: Review UIs PEX 7.7: Update SDD

	LWA4/8: Integrate App PEX 8.1: Review SRS and SDD PEX 8.2: Establish integration procedures and environment PEX 8.3: Perform application component Integration PEX 8.4: Perform integration Tests PEX 8.5: Update SDD
	LWA4/9: Occupational health safety and environmental protection practices PEX 9/1: Develop a work safety manual PEX 9/2: Train employees on safety PEX 9/3: Wear personal protective gear PEX 9/4: Restrict entry to firm with barriers PEX 9/5: Display safety signs PEX 9/6: Administer first aid PEX 9/7: Manage waste PEX 9/8: Perform fire fighting
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • Knowledge on application software • Knowledge on computer components • Knowledge on data collection tools • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on budgeting • Knowledge on team management • Knowledge on collaboration tools • Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on problem solving • Knowledge on requirement elicitation • Knowledge on usage of tools and materials

	• Knowledge on Planning • Knowledge on design principles and standards • Knowledge on software development principles • Knowledge on software development technologies • Knowledge on design patterns • Knowledge on software metrics • Knowledge on measurement • Knowledge on programming
Average duration of learning	320 hours (40 days) of nominal learning suggested to include • *15 days of occupational theory and* • *25 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	PPEs, blower, data-recovery software, HDD, flash disk, computer, Off shelf software, White board, Projector, Bag, Cloud storage, Work Identification.
Minimum required materials and consumables or equivalent	Stationery, Face masks, Gloves, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards.
Special notes	

Code	UE/MAD/M1.5
Module title	**M1.5: Test the mobile application**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATION DEVELOPER UVQ1)
Qualification Level	1
Module purpose	By the end of this module, the trainee should be able to test a mobile application
Learning-Working Assignments (LWAs)	**LWA5/1: Create a Test Plan** **LWA5/2: Testing the Application** **LWA5/3: Generate Test Report** **LWA5/4: Occupational health safety and environmental protection practices** ***Note:*** 5 *The learning exercises may be repeated till the trainee acquires a targeted competence.* 6 *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.*
	LWA5/1: Create a Test Plan PEX 1.1: Review application PEX 1.2: Draft Test Plan Document
Related Practical Exercises (PEXs)	**LWA5/2: Perform Application testing** PEX 2.1: setup Test environment PEX 2.2: Perform Component Testing PEX 2.3: Perform Integration Testing
	LWA5/3: Generate Test Report PEX 3.1: Write Test Report PEX 3.2: Update SDD and SRS

	LWA5/4: Occupational health safety and environmental protection practices PEX 4/1: Develop a work safety manual PEX 4/2: Train employees on safety PEX 4/4: Wear personal protective gear PEX 4/5: Restrict entry to firm with barriers PEX 4/6: Display safety signs PEX 4/7: Administer first aid PEX 4/8: Manage waste PEX 4/9: Perform fire fighting
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • Knowledge on application software • Knowledge on computer components • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on team management • Knowledge on collaboration tools • Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on problem solving • Knowledge on usage of tools and materials • Knowledge on Planning • Knowledge on design principles and standards • Knowledge on software development principles • Knowledge on software development technologies • Knowledge on design patterns • Knowledge on software metrics • Knowledge on programming

Average duration of learning	200 hours (25 days) of nominal learning suggested to include • *5 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/ 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	PPEs, blower, data-recovery software, HDD, flash disk, computer, Off shelf software, White board, Projector, Bag, Cloud storage, Work Identification.
Minimum required materials and consumables or equivalent	Stationery, Face masks, Gloves, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards.
Special notes	

Code	UE/MAD/M1.6
Module title	**M1.6: Maintain mobile applications**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATION DEVELOPER UVQ1)
Qualification Level	1
Module purpose	By the end of this module, the trainee will be able to maintain and use a mobile application
Learning-Working Assignments (LWAs)	**LWA6/1: Write the maintenance plan** **LWA6/2: Maintain application** **LWA6/3: Generate maintenance report** **LWA6/4: Occupational health safety and environmental protection practices** ***Note:*** 7 *The learning exercises may be repeated till the trainee acquires a targeted competence.* 8 *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.*
Related Practical Exercises (PEXs)	**LWA6/1: Write the maintenance plan** PEX 1.1: Identify bugs and errors PEX 1.2: Identify software and hardware upgrades and downgrades PEX 1.3: Write the maintenance plan
	LWA6/2: Maintain application PEX 2.1Review maintenance plan PEX 2.2 Fix bugs and errors PEX 2.3: Perform version control PEX 2.4: Perform system audit PEX 2.5: Write a maintenance report
	LWA6/3: Plan Monitor and evaluate project PEX 3.1: Review project work plan PEX 3.2: Set project targets and indicators PEX 3.3: Determine Monitoring and evaluation methodology PEX 3.4: Write an M&E plan

	LWA6/4: Occupational health safety and environmental protection practices PEX 4/1: Develop a work safety manual PEX 4/2: Train employees on safety PEX 4/3: Wear personal protective gear PEX 4/4: Restrict entry to firm with barriers PEX 4/5: Display safety signs PEX 4/6: Administer first aid PEX 4/7: Manage waste PEX 4/8: Perform fire fighting
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • Knowledge on application software • Knowledge on computer components • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on team management • Knowledge on collaboration tools • Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on problem solving • Knowledge on usage of tools and materials • Knowledge on Planning • Knowledge on design principles and standards • Knowledge on software development principles • Knowledge on software development technologies • Knowledge on design patterns • Knowledge on software metrics • Knowledge on mobile application software maintenance • Knowledge on debugging and building

	• Knowledge on contracts and policies • Knowledge on monitoring and evaluate • Knowledge on Record keeping • Knowledge on procurement • Knowledge on Waste management • Knowledge on programming • Knowledge on time management
Average duration of learning	200 hours (25 days) of nominal learning suggested to include • *5 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/ 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	PPEs, blower, data-recovery software, HDD, flash disk, computer, Off shelf software, White board, Projector, Bag, Cloud storage, Work Identification.
Minimum required materials and consumables or equivalent	Stationery, Face masks, Gloves, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards.
Special notes	

Code	UE/MAD/M1.7
Module title	**M1.7: Develop a mobile applications business**
Related Qualification	Part of: Uganda Vocational Qualification (MOBILE APPLICATION DEVELOPER UVQ1)
Qualification Level	1
Module purpose	By the end of this module, the trainee should be able to establish a mobile applications business
Learning-Working Assignments (LWAs)	**LWA7/1: Generate a business proposal** **LWA7/2: Manage contracts and legal documents** **LWA7/3: Establish a mobile applications business** **LWA7/4: Occupational health safety and environmental protection practices** ***Note:*** 9 *The learning exercises may be repeated till the trainee acquires a targeted competence.* 10 *The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.*
Related Practical Exercises (PEXs)	**LWA7/1: Develop a business proposal** PEX 1.1: Review the feasibility report PEX 1.2: Write a Concept document PEX 1.3: Write a proposal document PEX 1.4: Review and signoff of the document
	LWA7/2: Manage contracts and legal documents PEX 2.1: Review the Proposal document PEX 2.2: Write a contract of engagement PEX 2.3: Register enterprise PEX 2.4: File taxes PEX 2.5: Manage Intellectual property PEX 2.6: Manage social security fund PEX 2.7: Acquire business licences PEX 2.8: Manage human resource contracts

	LWA7/3: Establish a mobile applications business PEX 3.1: Conduct feasibility study PEX 3.2: Set up an organisation structure PEX 3.3: Make budget PEX 3.4: Setup office space PEX 3.5: Recruit staff PEX 3.6: Brand and market business
	LWA 7/4: Market Mobile applications business PEX 4.1: Brand business PEX 4.2: Advertise business PEX 4.3: Establish sales distribution channels
	LWA7/5: Occupational health safety and environmental protection practices PEX 5/1: Develop a work safety manual PEX 5/2: Train employees on safety PEX 5/3: Wear personal protective gear PEX 5/4: Restrict entry to firm with barriers PEX 5/5: Display safety signs PEX 5/6: Administer first aid PEX 5/7: Manage waste PEX 5/8: Perform fire fighting PEX 5/9: Install lightning conductors PEX 5/10: Install cameras
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	*For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:* • Knowledge on application software • Knowledge on computer components • Knowledge on report writing skills • Knowledge on Communication skills • Knowledge on team management • Knowledge on collaboration tools

	• Knowledge on work safety • Knowledge on work ethics • Knowledge on decision making skills • Knowledge on brain storming • Knowledge on problem solving • Knowledge on usage of tools and materials • Knowledge on Planning • Knowledge on contracts and policies • Knowledge on monitoring and evaluate • Knowledge on Record keeping • Knowledge on procurement • Knowledge on Waste management • Knowledge on mobile application usage • Knowledge on user requirements • Knowledge on intellectual property
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/ 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	PPEs, Hammer, Blower, data-recovery software, HDD, flash disk, computer, Off shelf software, White board, Projector, Bag, Cloud storage, Work Identification, Smartphone, Screw drivers, Drilling machine, Trade licenses
Minimum required materials and consumables or equivalent	Stationery, Face masks, Gloves, cleaning cloth, Water, Sanitizer, Internet, Electricity, Airtime, Business cards.
Special notes	

ATP- PART III

Assessment Instruments for MOBILE APPLICATIONS DEVELOPER

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

3.9

3.10 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- Cause-Effect	1
5.	Written (Theory)- Matching item (Work sequence)	2
6.	Performance (Practical) Test Items	1
	Total	**10**

WRITTEN TEST ITEMS (SAMPLES)

<table>
<tr><th>DIT/ QS</th><th colspan="4">Test Item Database
Written (Theory) Test Item- No. 1</th></tr>
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<tr><td>Competence level:</td><td colspan="4">2</td></tr>
<tr><td>Code no.</td><td colspan="4"></td></tr>
<tr><td>Test Item type:</td><td colspan="4"><table>
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<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>
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<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">M1.1</td></tr>
<tr><td>Time allocation:</td><td colspan="4">3 minutes</td></tr>
</table>

Test Item	List any 4 steps that involved in project planning
Answer spaces	1. …… 2. ……... 3. …….. 4. ……..
Expected key (answers)	1. Develop a Work plan 2. Conduct a feasibility study 3. Project costing 4. Plan Monitor and evaluate project 5. Manage project risks 6. Develop a work safety plan

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<tr><th>DIT/ QS</th><th colspan="4">Test Item Database
Written (Theory) Test Item- No. 2</th></tr>
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<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>
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<tr><td>Related module:</td><td colspan="4">M1.4</td></tr>
<tr><td>Time allocation:</td><td colspan="4">4 minutes</td></tr>
</table>

Test Item	Mention any four steps followed in securing a mobile application.
Answer spaces	1. …… 2. …….. 3. …….. 4. ……...
Key (answer)	1. SRS and SDD 2. Determine security protocols 3. Establish security protocols 4. Write a security standards manual 5. Review the Security standards manual 6. Update SDD

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 3			
Occupational Title:	Mobile Application Developer			
Competence level:	2			
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:	M1.2, M1.3			
Time allocation:	2 minutes			

Test Item	Which of the following is **NOT** part of requirements engineering?
Answer spaces	a) Requirement Analysis and Specification. b) Write the software design document c) Requirements Management d) Verification and Validation

Key (answer)	A

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 4
Occupational Title:	Mobile Application Developer
Competence level:	2
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:	M2.3
Time allocation:	2 minutes

Test Item	Development of application logic results into …… **EXCEPT**
Answer spaces	a) Pseudocode. b) Application UI c) Design patterns. d) APIs.

Key (answer)	B

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 5
Occupational Title:	Mobile Application Developer
Competence level:	2
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:	M1.3
Time allocation:	2 minutes

Test Item	Which of the following activities is involved in UI Design ?
Answer spaces	a) Database Modelling. b) Entity Relationship Modelling. c) Wireframing. d) Component Design.

Key (answer)	C

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 6			
Occupational Title:	Mobile Application Developer			
Competence level:	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:	January 2022			
Related modules:	M1.2			
Time allocation:	4 minutes			

Test item	Match the following processes involved in determining application requirements with their correct tasks.

Column A	
1	Requirement Analysis and Specification
2	Requirements Verification and Validation
3	Requirements Management
4	

Column B	
A	Ranking of Application Requirements.
B	Perform Requirements Collection
C	Monitor and track requirements documents
D	Review requirements agreement

Key (answer)	1-B,2-A, 3-C.

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 7
Occupational Title:	MOBILE APPLICATION DEVELOPER
Competence level:	2
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:	M1.2
Time allocation:	3mins

Test item	Match the following

Column A (diseases)	
1.	Wrong API and database connection
2.	Wrong IDE configuration
3.	Wrong data collection
4.	Poor UI design

Column B (remedies)	
A.	Wrong Application requirements
B.	Application logs
C.	Failure to post data into the database
D.	Failure to build Application APK
E.	Wrong data entry

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

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 8
Occupational Title:	MOBILE APPLICATION DEVELOPER
Competence level:	2
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:	M1.3
Time allocation:	4 minutes

Test Item	Arrange the following steps as followed when designing an effective user interface.

Column A (chronology)	**Column B (work steps) in wrong chronology order**	
1.	A	Determine application user target group
2.	B	Create user interfaces
3.	C	Determine user requirements collection tool
4.	D	Create wireframes and sketches
5.	E	Analyze user requirements

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

DIT/ QS	Test Item Database Written (Theory) Test Item- No. 9
Occupational Title:	Mobile application developer
Competence level:	2
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:	M1.2
Time allocation:	4 minutes

Test Item	Arrange the steps as involved in requirements analysis and specification.

Column A (chronology)	**Column B (work steps) in wrong chronology order**	
1.	A	Collect data.
2.	B	Act on Results
3.	C	Determine Goals and Objectives
4.	D	Analyze and interpret the data
5.	E	Select data collection methods
6.	F	Identify the Problem Statement

Key (answer)	1: F; 2: C; 3: E; 4: A, 5: D, 6: B.

PERFORMANCE TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Performance Test Item- no.2
Occupational Title:	Mobile Application Developer
Competence level:	**1**
Code no.	
Test Item:	Setup a Development environment for an android application. Design, develop and deploy an android mobile application that requires user authentication with the following details first name, last name, username, email, password and a welcome screen.
Performance level:	P.3
Date of OP:	
Related Module:	M 1.4
Related skills and knowledge:	Internet Browsing, Application installation, System analysis, User Interface and User Experience design, hardware specification, Database Design, application testing, programming, collaboration and communication skills, troubleshooting, legal knowledge, requirements analysis skills.
Required tools, materials and equipment:	Computer, Uninterruptable power supply, Router or Modem, Smartphone, USB Cable, Internet Browser, Android Studio, MySQL Work bench, Xammp, Book and Pen, Internet subscription, GitHub, Microsoft visio, playstore, adobe XD, Proto IO and webhosting account.
Time allocation:	8 hours
Preferred venue:	Computer Lab
Remarks for candidates	Trainees should save their work. Trainees should comment their code.
Remarks for assessors	Provide all the required tools, equipment and materials for assessment. Test run a live demo of the application when awarding scores.

#	Assessment criteria	Scoring guide	Max. Score	
			Process	Result
1.	**Setting up the development environment**	Downloaded Android Studio	3	
		Latest version of android studio file observed		1
		Installed Android Studio	2	
		A working android studio observed		2
		Downloaded Android emulator		2
		Installed Android emulator	2	
		A working Android emulator observed		2
		Tested IDE and Emulator	2	
		A working integrated Development Environment Observed		2
2	**Designing and developing the database**	Downloaded MySQL Workbench and XAMMP		2
		Installed MySQL Workbench and XAMMP.	2	
		Working MySQL Workbench and XAMMP observed.		1
		Designed entity relationship diagrams		4
		Generated database schema	2	
		A functional database observed.		2
3	**Designing and developing login and registration interfaces**	Developed User Interfaces for the Login, Sign Up, and Home Screens	2	
		Working and correctly aligned Login, Sign Up, and Home Screens observed		2
		Developed API (login and signup)		4
		Connected the Interface to the API and the database	4	
		Built APK	3	
		Debugged Application	2	

		An error free Android application observed		2
4	**Testing the android Application**	Tested internet connectivity	1	
		Tested UI, API and database Connectivity	2	
		Posted Registration details in the database observed		2
		Tested Login authentication	1	
		Wrong user account entries rejection observed		1
		A working Android Application observed		4
	Deploying the Android application to the play store	Setup Publishing account	2	
		A working publishing account observed		2
		Uploaded APK		4
	TOTAL	$\frac{X}{Y} X\ 100$	29	39
			68	

4.0 ATP- PART IV

INFORMATION ON REVIEWED PROCESS

4.1 Occupational Profile Development (January 2022)

Job practitioners who were working in the occupation of MOBILE APPLICATIONS DEVELOPER exclusively developed the assessment and Training Package**.**

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 MOBILE APPLICATIONS DEVELOPER 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 MOBILE APPLICATIONS DEVELOPER 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;

Development Panel		
No.	**Name**	**Institution/ Organization**
1.	Tuhame Moses	NCDC
2.	Otim Allan	Kyambogo College School
3.	Mudawa Charles	Mwiri College Busoga
4.	Mubangizi Justus	Ntare School
5.	Kibirige Richard	St. Henry's College Kitovu
6.	Mukulu Robert	Namilyango College
7.	Allan Lule	Makerere Innovation and incubation center
8.	Komuntu Oscar	Umeme LTD
9.	Bamwine Jeremiah Bigirwa	Mihasoft
10.	Nkuutu Ramathan	Wolfarm Technologies

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) -** Mr. Kule Asasio Liketha, Mr. Lubowa Christopher Derrick.
3. **Facilitators (Training Modules Development) -** Mr. Kule Asasio Liketha, Mr. Lubowa Christopher Derrick.
4. **Facilitators (Test Item Development) -** Mr. Kule Asasio Liketha, Mr. Lubowa Christopher Derrick.
5. **Compiled** by Mr. Masolo Joshua Solomon, Mr. Obitre Ronald, 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 January 2022 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions:

1. Michael Burton, Android App Development for Dummies, 3ed.(2015)
2. Techy James , iPHONE 11 SERIES BEGINNERS GUIDE: A Complete Step by Step Guide To Master iPhone 11, 11 Pro ,11 Max and iOS 13: Tips and Tricks For Every Beginner (2019)
3. Lean Mobile App Development: Apply Lean startup methodologies to develop successful iOS and Android apps by Kindle.
4. Coding Projects in Flutter: A Hands-On, Project-Based Introduction to Mobile App Development by [Edward Thornton]
5. App Secrets: How to Create a Million Dollar App by Sean Casto
6. Learn to Program with App Inventor: A Visual Introduction to Building Apps by Lyra Logan
7. Android App Development for Dummies 3rd Edition by Michael Burton
8. Beginning iOS 14 & Swift App Development: Develop iOS Apps, Widgets with Xcode 12, Swift 5, SwiftUI, ARKit and more by Greg Lim
9. iOS 15 Programming for Beginners: Kick start your mobile app development journey by building iOS apps with Swift 5.5 and Xcode 13, 6th Edition by Ahmad Sahar
10. How to Build Android Apps with Kotlin: A hands-on guide to developing, testing, and publishing your first apps with Android by Alex Forrester.
11. Beginning App Development with Flutter: Create Cross-Platform Mobile Apps by Rap Payne.
12. Creating Mobile Apps with Xamarin. Forms Preview Edition 2 (Developer Reference) by Charles Petzold
13. Mobile App Marketing And Monetization: How to Promote Mobile Apps Like A Pro: Learn to promote and monetize your Android or iPhone app. Get hundreds ... of downloads and grow your app business buy Alex Genadinik