



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

CURRICULUM STRUCTURE

RQF LEVEL

3

TVET CERTIFICATE III
in
PUBLIC WORKS

CBSPWO3001

Kigali, May, 2022

CBSPWO3001-TVET CERTIFICATE III

In Public Works

RQF Level 3 CURRICULUM

Supported by

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List of Abbreviations

RTB	Rwanda Tvet Board
CBA	Competency Based Assessment
CBT	Competency Based Training
RPL	Recognition of Prior Learning
LO	Learning Outcome
PK	Point Kilometrique
HOD	Head Of Department
PWO	Public Works
RPO	Rwanda Plumbers Organisation
NST	National Strategic Transformation
ENABEL	Belgian Development Agency
4IR	Fourth Industrial Revolutions
CAD	Computer Aided Design
CDU	Curriculum Development Unit
CM	Complementary Modules
SJITC	Saint Joseph Integrated Technical College
CV	Curriculum Vitae
DACUM	Developing a Curriculum
EDPRS	Economic Development and Poverty Reduction Strategy
GS&C	General Surveying and Construction
HR	Human Resources
IAP	Industrial Attachment Program
RTDA	Rwanda Transport Development Agency
IPRC	Integrated Polytechnics Regional College
MBO	Management by Objectives
MINEDUC	Ministry of Education
OECD	Organization for Economic Co-operation and Development
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
RQF	Rwandan Education Qualification Framework
RP	Rwanda polytechnic
SOP	Standard Operating Procedures
SSC	Shared Service Centers
SWOT	Strength Weakness Opportunities and Treats
TSS	Technical Secondary School
TVET	Technical and Vocational Education and Training
WHS	Work Health & Safety
UR/CST	University of Rwanda/ College of Science and Technology
RSB	Rwanda Standard Board
STECOMA	Syndicat des Travailleurs des Entreprises de Construction, Menuserie et Artisanat
GEOC	Geotechnical ,Environmental and Organic matters Construction

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11	MUHAYIMANA Theoneste	KAYENZI TVET SCHOOL	Trainer
12	KANZAYIRE Collette	RWABUYE TVET	Trainer
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FOREWORD

The global rapid changes in the labour market tends do call for appropriate training and skills development through outcome-based training approaches. Skills development and employment promotion are central to Rwanda’s transformative Vision 2050, aiming to secure high standards of living for all Rwandans. In a bid to transform Rwanda into a knowledge based economy, the National Strategic Transformation 1(NST1) calls socio-economic transformation through TVET skills development. The Rwanda TVET Board (RTB) was established to promote quality education in technical and vocation education and training from level one (1) to five (5) aimed at fast tracking socio-economic development of the country. Designing and distributing curricula, teaching materials, trainer’s guides, methodologies and establish training methods for technical and vocation education and training from level one (1) to five (5); is among other RTB’s responsibilities.

The existing curricula were limited and narrowed in terms of acquired skills and knowledge and were not meeting the requirements of the current labour market at both national and regional level. In addition there were. Barriers in vertical mobility and pathways in TVET which resulted in negative TVET perception. Furthermore, the were barriers to admission of TVET graduates of certain programs into higher learning institutions.

The TVET modernization process has begun with a clear picture of the programs focusing on sector with the high employment potential like Public Works among others. In this respect, Rwanda TVET Board, in collaboration with ENABEL, is honored to avail the revised curriculum of Public Works which serves as the official document and respond to the above mentioned concerns

With the help of the training providers, trainers, parents whose role is central to the success of this curriculum, the trainees will gain appropriate hand on skills which will make a difference not only to their own lives but also to the success of Rwanda’s economy.

I wish to sincerely extend my appreciation to the people who contributed towards the development of this document.

Eng._ Dip. Paul UMUKUNZI

Director General/ RTB

1. GENERAL INTRODUCTION

The curriculum presents a coherent and significant set of competencies to perform the occupation/s of an Assistant road maintainer, Masonry Technician, Excavation technician, Pavement Technician, Grading technician, Road marker and signs technicians, Safety Officer and Unpaved road technician. It is designed with an approach that takes into account the training needs, the work situation, as well as the goals and the means to implement the training.

The modules of the curriculum include a description of the expected results of the training. They have a direct influence on the choice of the theoretical and practical learning activities. The competencies are the targets of the training: the acquisition of each is required for certification.

The curriculum is the reference to carry out the assessment of learning. Assessment tools of learning are developed based on this document.

The curriculum consists of three parts. The first part is of general interest and shows the nature and goals of the program and the key concepts and definitions used in the document. The second part presents the qualification, its level in the qualification framework, its purpose, its rationale and the list of modules it comprises. The third part deals with the training package. It includes the competencies chart, the sequencing of module learning, the description of each module and the course structure.

The pages describing the modules are the heart of a curriculum. They present the title of the module, the length of training, the amount of credits, the context in which the competency is performed, the prerequisite competencies, the learning units and the performance criteria.

In each module, a course structure is provided. The course structure describes the learning outcomes (knowledge, skills and attitudes) and the learning contents related to each learning unit. In addition, the learning outcomes / activities and resources are included and where applicable, reference standards are mentioned for indicative contents. Standard reference numbers are indicated throughout the text and the full standards' titles in a the reference section.

Finally, the assessment specifications and guidelines are included in each module.

1.1. Rationale of the Qualification

Rwanda's building and construction industry has rapidly grown in the past couple of years with both government and private sector engaged in the construction of buildings and roads infrastructure triggering what is now dubbed as a "construction boom in Rwanda". The construction industry contributes immensely towards the GDP of the Country mainly through direct income and massive employment opportunities generated from various infrastructure projects, rehabilitation and maintenance. It is estimated that the construction sub-sector of the larger industrial sector contributes the highest to the country's industrial GDP. However, there has been a shortage in skilled Construction workers to work in the various formentioned constructions.

Additionally, there has been an over dependence on imported building materials, which depletes the meager foreign exchange resources while denying the citizens the opportunities of production of the materials locally. In Rwanda, the available amounts of clay, wood/timber, sand and stone are not fully exploited for industrial growth. Nyarugenge District for example, has 700,000 cubic meters of clay ; this shows the richness of natural resources in Rwanda. Whomever, there is a need for detailed geology studies to establish the exact quantities of these construction materials nationwide and establish their lifespan and quality.

The construction materials industry in Rwanda was profiled with a sampled analysis of eleven natural construction materials extractors, seven man-made products manufacturers and twelve contractors. The emerging issues highlight the following opportunities: vast quantities of natural construction materials, plenty of traditional knowledge in construction, a willing human resource, availability of construction industry related to technical institutions, regional integration and political will by the government to revitalize the industry. The constraints and weaknesses to development of this industry were identified as follows: an inefficient , inconsistent supply of raw materials, limited skilled manpower, capital-acquisition difficulties, high competition from other regional actors (from Kenya and Uganda), inconsistent and inadequate energy/power supply and low quality production output.

Therefore, **an Assistant road maintainer, Masonry Technician ,Excavation technician, Pavement Technician ,Grading technician ,Road marker and signs technicians, Safety Officer, and Unpaved road technician** workers are the key occupations that need to be addressed to drive the target of the government in construction/Public works Sector.

2. QUALIFICATION DETAILS

2.1. Description

Title:	TVET Certificate 3 In Public Works
Level:	RQF Level 3
Credits:	120
Sector:	Construction and Building Services
Trade:	Public Works
Issue date:	May, 2022

2.2. Graduate profile

This qualification provides the skills, knowledge, and attitude for a learner to be competent in a range of routine tasks and activities that require the application of practical skills in a defined context. Work would be undertaken in various building and construction enterprises where erecting foundation and walls, plastering and screeding pavement are carried out. Learners may work with some autonomy or in a team but usually under close supervision.

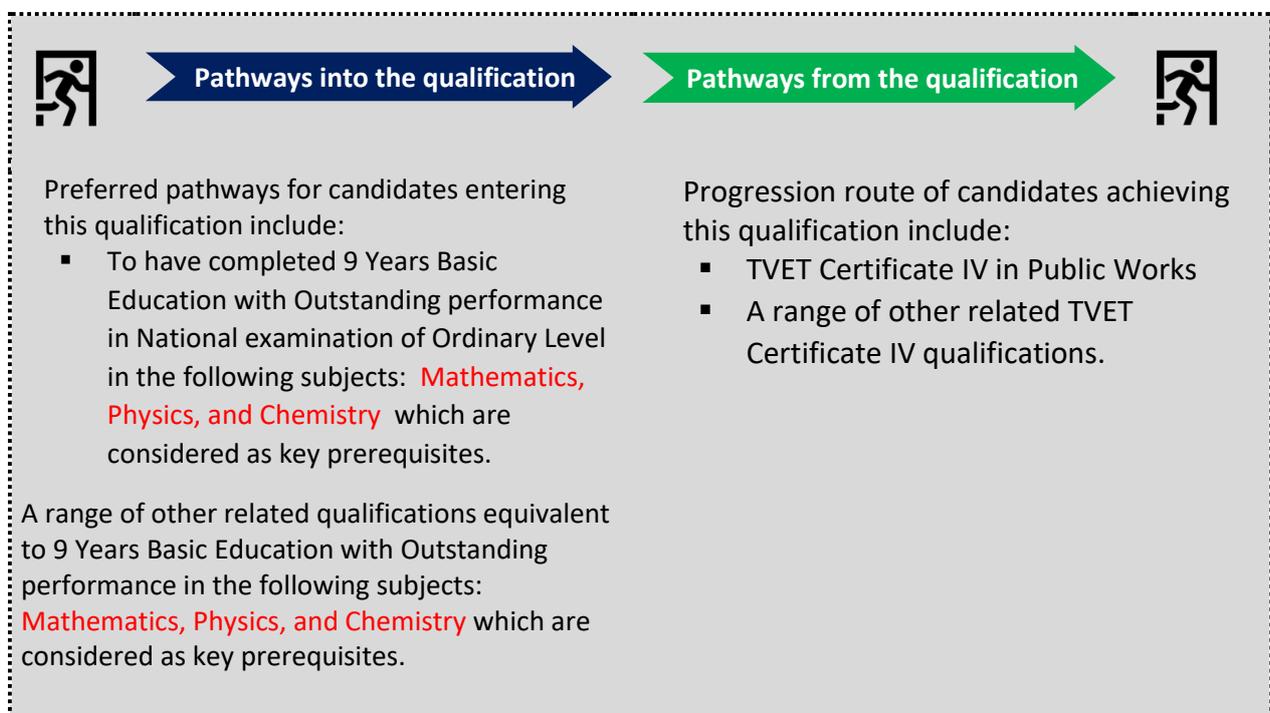
At the end of this qualification, qualified learners will be able to:

1. Describe the occupation and learning process
2. Maintain SHE at workplace
3. Create a Business
4. Communicate simply using English in familiar situations
5. Apply computer literacy
6. Comply with Citizenship values
7. Pratiquer l'activité de communication en français dans le metier
8. Kutumia Kiswahili Wastani
9. Gukoresha Ikinyarwanda kiboneye
10. Apply Algebra and Trigonometry
11. Demonstrate Basics of Chemistry
12. Apply general physics
13. Establish Road Signs, Marking and Crash Barriers
14. Apply Public Work Hygiene and Safety Precautions
15. Perform Technical Drawing
16. Describe Public Works Resources

17. Set Road Alignment
18. Conduct field excavation works
19. Perform masonry works
20. Construct Retaining walls
21. Construct drainage structures
22. Perform Unpaved road maintenance
23. Construct unpaved road
24. Integrate the workplace

2.3 Minimum entry requirements and pathways

The minimum entry requirement to this course is to be mentally fit with an interest in Public Works and related areas.



2.4 Job related information

This qualification prepares individuals to integrate the construction industry with the professionalization of Road marker. This qualification again offers the opportunity to execute the works as Assistant road maintainer, Masonry Technician, Excavation technician, Pavement Technician, Grading technician, signs technicians, Safety Officer, and Unpaved road technician while ensuring that safety, security and environmental regulations are respected.



Possible jobs related to this qualification

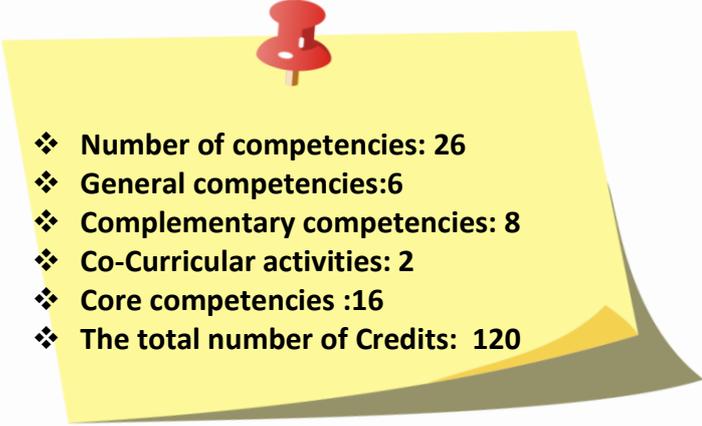
Assistant road maintainer,
Masonry Technician,
Excavation technician,
Pavement Technician,
Grading technician,
Unpaved road technician,
Road marker,
Signs technicians, and
Safety Officer.

2.5 Information about competencies

No	Code	Complementary competencies	Credit
1	CCMOL302	Describe the occupation and learning process	3
2	CCMHE302	Maintain SHE at workplace	3
3	CCMBC302	Create a Business	3
4	CCMCC302	Comply with Citizenship Values	3
5	CCMCF302	Pratiquer l'activité de Communication en Français dans le métier	3
6	CCMEN302	Communicate simply using English in familiar situations	3
7	CCMCL302	Apply computer literacy	3
8	CCMKN302	Gukoresha Ikinyarwandakiboneye	3
Total			24

No	Co-Curricular activities	Credit
1	Sports/Clubs	1
2	Self-study/Library Research	1
Total		2

	No	Code	Core competencies	Credit
GENERAL	1.	GENAM301	Apply Algebra and Trigonometry	6
	2.	GENBC301	Demonstrate Basics of Chemistry	3
	3.	GENPY301	Apply general physics	4
	4.	PWOTD301	Basic Technical Drawing	8
	5.	GENKK302	Kutumia Kiswahili Wastani	3
	6.	PWOSH301	Public Works Hygiene and Safety Precautions	3
SPECIFIC	7.	PWORS301	Establish Road Signs, Marking and Crush Barriers	4
	8.	PWOURC301	Construct unpaved Roads	5
	9.	PWOFE301	Conduct field excavation works	3
	10.	PWODS301	Construct drainage structures	5
	11.	PWOMW301	Perform masonry works	12
	12.	PWOPR301	Describe Public Works Resources	3
	13.	PWOUM301	Perform unpaved road Maintenance	4
	14.	PWORW301	Construct Retaining walls	7
	15.	PWORA301	Set out Road Alignment	4
	16.	PWOIAP301	Integrate the Workplace	20
Total				94

- 
- ❖ **Number of competencies: 26**
 - ❖ **General competencies: 6**
 - ❖ **Complementary competencies: 8**
 - ❖ **Co-Curricular activities: 2**
 - ❖ **Core competencies : 16**
 - ❖ **The total number of Credits: 120**

2.6 Allocation of Learning Hours

N0	Module name	Learning Outcome	Theoretical hours	Practical hours	Total hours
1	Public Works Hygiene and Safety Precautions	LO1: Maintain personal hygiene	3 hours	2 hours	5 hours
		LO2: Identify construction public works hazards and emergencies at Workplace	6 hours	4 hours	10 hours
		LO3: Maintain construction public works instruments	3 hours	12 hours	15 hours
Total hours			12 hours	18 hours	30 hours
2	Basic Technical Drawing Application	LO1: Identify drawing materials, instruments and equipment	2 hours	3 hours	5 hours
		LO2: Use drawing, materials, instruments and equipment	3 hours	7 hours	10 hours
		LO3: Interpret Lines and Symbols	3 hours	7 hours	10 hours
		LO4: Apply drawing scales, dimensions and lettering	6 hours	14 hours	20 hours
		LO5: Draw figures, solids and projections	10 hours	25 hours	35 hours
Total hours			24 hours	56 hours	80 hours
3	Retaining Wall Construction	LO1: Plan, and prepare the work requirements	2 hours	3 hours	5 hours
		LO2: Prepare workplace	3 hours	7 hours	10 hours
		LO3: Construct stone masonry retaining wall	3 hours	7 hours	10 hours
		LO4: Construct Gabions	4 hours	11 hours	15 hours

		LO5: Construct honey combs retaining wall	4 hours	11 hours	15 hours
		LO6: Construct a Reinforced concrete retaining wall.	4 hours	11 hours	15 hours
Total hours			20 hours	50 hours	70 hours
4	Drainage Structures Construction	LO1: Prepare for work	3 hours	7 hours	10 hours
		LO2: Excavate trenches	3 hours	7 hours	10 hours
		LO3: Construct drainage system structures	6 hours	14 hours	20 hours
		LO4: Apply erosion control method and cleaning	3 hours	7 hours	10 hours
Total hours			15 hours	35 hours	50 hours
5	Public Work Resources	LO1: Describe the construction materials used in public works	3 hours	7 hours	10 hours
		LO2: Describe tools, equipment and facilities required for public works	3 hours	7 hours	10 hours
		LO3: Identify team composition for public works	3 hours	7 hours	10 hours
Total hours			9 hours	21 hours	30 hours
6	Establish Road Signs, Road Marking And Crash Barriers	LO1: Apply road marking	3 hours	7 hours	10 hours
		LO2: Install road signs	4 hours	11 hours	15 hours
		LO3: Install crash barriers	3 hours	7 hours	10 hours
		LO4: Clean up	2 hours	3 hours	5 hours
Total hours			12 hours	28 hours	40 hours
7	Field Excavation Works	LO1: Select materials, tools and equipment	2 hours	3 hours	5 hours
		LO2: Prepare site for excavation	3 hours	2 hours	5 hours
		LO3: Carry out excavation works	5 hours	10 hours	15 hours
		LO4: Clean up	2 hours	3 hours	5 hours

		construction work place			
Total hours			12 hours	18 hours	30 hours
8	Masonry Works	LO1: Set out structure	9 hours	21 hours	30 hours
		LO2: construct stone masonry	9 hours	21 hours	30 hours
		LO3: construct brick masonry	9 hour	21 hours	30 hours
		LO4: lay pavers and pitches	9 hours	21 hours	30 hours
Total hours			36 hours	84 hours	120 hours
9	Road Alignment Setting	LO1: Prepare for work	2 hours	3 hours	5 hours
		LO2: Set levels	4 hours	11 hours	15 hours
		LO3: Delineate road profiles	6 hours	14 hours	20 hours
Total hours			12 hours	28 hours	40 hours
10	Construct Unpaved Road	LO1: Plan and prepare relevant works for unpaved road construction	4 hours	11 hours	15 hours
		LO2: Prepare Subgrade	6 hours	14 hours	20 hours
		LO3: Construct gravel wearing course	4 hours	11 hours	15 hours
Total hours			14 hours	36 hours	50 hours
11	Unpaved Road Maintenance	LO1: Prepare for work.	3 hours	7 hours	10 hours
		LO2: Perform routine maintenance	3 hours	7 hours	10 hours
		LO3: Perform periodic maintenance	3 hours	7 hours	10 hours
		LO4: Perform emergency maintenance	3 hours	7 hours	10 hours
Total hours			12 hours	28 hours	40 hours

3. TRAINING PACKAGE

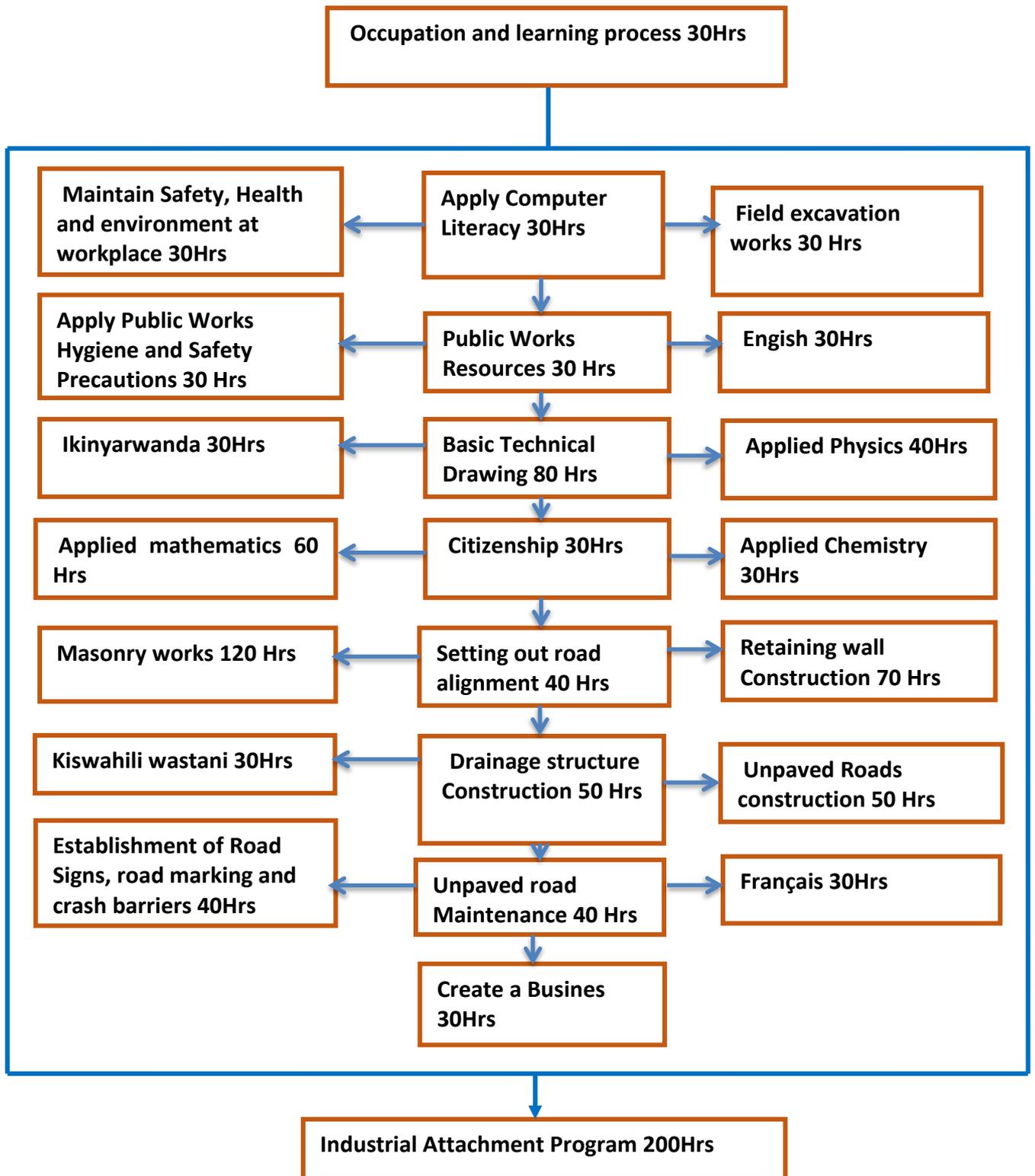
The training package includes the competencies chart, the flowchart, the modules, the course structure, and the assessment guidelines.

3.1 Course structure

The course structure describes the learning outcomes for each learning unit. These learning outcomes are the essential skills and knowledge to be acquired. The contents to be covered for each learning outcome are prescriptive. The Learning Activities contain a series of suggestions, usually with several options, that will guide the learner and the trainer.

3.2 Flowchart

The flowchart of sequencing of learning is a schematic representation of the order of acquisition of the competencies. It provides an overall planning of the entire training programme and shows the relationship between the modules. This type of planning is to ensure consistency and progression of learning. For each module, the flowchart shows the learning that is already in place, the learning that is to take in parallel or later. The positions defined will have a decisive impact on all subsequent pedagogical choices. The flowchart of the sequence of learning of the modules of the training programme is presented on the following page.



4. ASSESSMENT GUIDELINES

4.1 Assessment Methodology

To assess knowledge, practical, and application skills through a jury system of continuous evaluation that encourages learners to display understanding of the principles in application to set practical tasks and their attendant theory to assess self-learning.

There are two types of assessment (Formative Assessment and Summative/Integrated Assessment). Each assessment has its own rule for passing to be declared competent.

Formative Assessment

This is applied on all types of modules (e.g. Complementary, General and Specific modules)

A trainee to be competent for a formative module must have at least 70%

A trainee to be eligible to undertake integrated assessment of specific modules must have at least 50% as passing line for general and complementary modules.

Each trainee should be competent on all formative assessments to be declared competent on that module

All formative assessment should be declared competent before taking the summative/integrated assessment

Summative Assessment

All Summative/Integrated assessment should match with the content of the module in the curriculum.

Summative/Integrated Assessment is always in practical, giving it as a theoretical type of assessment is not acceptable.

The integrated situation provided in the curriculum is a sample of the assessment to be carried out, the Trainer/Teacher has the role of developing another one referring to the task to be carried out in the integrated situation in accordance to the circumstances inside school, but the integrated situation should stick on the components of a task.

During Summative/Integrated assessment, assessor panel members should be three (3).

The trainee can be declared competent based on the assessment CRITERIA and its respective assessment indicators

The Passing Line for the modules is:

- 50 % for general and complementary modules
- 70 % for specific modules

Training delivery		100%	Assessment		Total 100%
Theoretical content		30%	Formative assessment	30%	50%
Practical work:		70%		70%	
Group project and presentation	20%				
Individual project /Work	50%				
			Summative Assessment	50%	

Note:

1. Summative assessment is always conducted at the completion of module delivery. It should be practical through an integrated situation for specific modules and in any other forms of assessment for complementary and general modules.

2. Learning hours assigned to specific module includes the duration assigned to integrated assessment.

GLOSSARY

1. **Assessment:** A process of gathering and judging evidence in order to decide whether a person has attained a standard of performance.
2. **Assessment criteria:** Statements which describe performances and place them in context with sufficient precision to allow valid and reliable assessment.
3. **Best practice:** Management practices and work processes that lead to outstanding or top-class performance and provide examples for others.
4. **Competency standard:** An industry-determined specification of performance which sets out the skills, knowledge and attitudes required to operate effectively in employment. Competency standards are made up of units of competency, which are themselves made up of elements of competency, together with performance criteria, a range of variables, and an evidence guide.
5. **Competency:** means the ability to apply knowledge, skills and personal, social and methodological skills in the workplace or during learning, as well as in personal and professional development. This ability or capacity is acquired through leaning, exposure to the tasks and series of training allowing one to perform specific task autonomously. Reason why in the context of the CBE Framework competencies are described as responsibility and independence.
6. **Competency-based assessment (or CBA):** The gathering and judging of evidence in order to decide whether a person has achieved a standard of competency.
7. **Complementary competencies:** Set of knowledge, skills and attitudes which are not directly linked to a specific occupation or industry, but which are important for work, education and life in general, such as communication, mathematics, organizational aptitude, and computer literacy, interpersonal and analytical competency.
8. **Core modules:** Modules leading to competencies' acquisition that an industry sector has agreed upon as essential for a person to be accepted as competent at a particular level. All modules may be core, but in many cases competency at a level will involve core modules plus optional or specialization modules. Core competencies are normally those central to work in a particular industry.
9. **Credential:** Formal certification issued for successful achievement of a defined set of outcomes, e.g. successful completion of a course in recognition of having achieved particular knowledge, skills or competencies; successful completion of an apprenticeship or traineeship.

10. **Credit:** The acknowledgement that a person has satisfied the requirements of a module.
11. **Curriculum:** The specifications for a course or subject (module) which describe all the learning experiences a learner undergoes, generally including objectives, content, intended learning outcomes, teaching methodology, recommended or prescribed assessment tasks, assessment exemplars, etc.
12. **Evidence guide:** The part of a competency standard which provides a guide to the interpretation and assessment of the unit of competency, including the aspects which need to be emphasized in assessment, **relationships to other units, and the required evidence of competency.**
13. **Flexible delivery:** A range of approaches to providing education and training, giving learners greater choice of when, where and how they learn. Flexible delivery may involve distance education, mixed-mode delivery, online education, self-paced learning, self-directed learning, etc.
14. **Formal education:** Also formal training education or training provided in educational institutions such as schools, universities, colleges, etc. or off the job in a workplace, usually involving direction from a teacher or instructor.
15. **General competencies:** competencies correspond to larger operations that go beyond the tasks, but generally contribute to their implementation. These activities require more fundamental learning and are generally common to several tasks and transferable to many work situations.
16. **Generic modules:** Modules leading to the attainment of complementary competencies.
17. **Informal education:** The acquisition of knowledge and skills through experience, reading, social contact, etc.
18. **Internship:** An opportunity for a learner to integrate career related experience by participating in planned, supervised work.
19. **Key competencies:** Any of several generic skills or competencies considered essential for people to participate effectively in the workforce. Key competencies apply to work generally, rather than being specific to work in a particular occupation or industry. The following are key areas of competency which were developed into seven key competencies: collecting, analyzing and organizing information; communicating ideas and information; planning and organizing activities; working with others and in teams; using mathematical ideas and techniques; solving problems; and using technology.
20. **Knowledge:** means the result of the adoption of information through the learning process. Knowledge is a set of facts, principles, theories and practices

related to area of work or study.
In CBE context lifelong learning knowledge is described as theoretical and / or factual.

21. **Learning outcomes:** are statements of what learner knows, understands and can perform, based on the completion of the learning process, defined by knowledge, skill and competency.
22. **Learning activities:** Suggested activities that can be developed during lesson planning and activity preparation. The choice of learning activities must be tailored according to group size, available material resources and communication tools.
23. **Learning hours:** Amount of hours required to acquire the competency, including the time allocated to evaluation, which is estimated between 5 and 10% of the total learning time of the competency.
24. **Learning outcomes:** Statements that indicate what learners will know or be able to do as a result of a learning activity. Learning outcomes are usually expressed as knowledge, skills, or attitudes.
25. **Learning unit:** Any of the basic building blocks of a module, which describes the key activities or the elements of the work covered by the module
26. **Module:** A unit of training which corresponds to one competency and which can be completed on its own or linked to others.
27. **Occupation:** The principal business of one's life.
28. **Performance criteria** The part of a competency standard specifying the required level of performance in terms of a set of outcomes which need to be achieved in order to be deemed competent. It describes the quality requirements of the result obtained in labor performance.
29. **Qualification:** means the formal name for the result of a process of assessment and validation, which is obtained when a competent body determines that an individual has achieved learning outcomes to the standards laid down.
30. **Quality assurance:** The systems and procedures designed and implemented by an organization to ensure that its products and services are of a consistent standard and are being continuously improved.
31. **Recognition of prior learning (or RPL):** The acknowledgement of a person's skills and knowledge acquired through previous training, work or life experience, which may be used to grant status or credit in a subject or module.
32. **Skills:** are the ability to apply knowledge and use the principle of "know how" to perform a specific task and to solve the problem. In the context of the CBE Framework, skills are defined as cognitive (involving the use of logical, intuitive and creative thinking), practical (including physical skill and use of methods, materials, devices and instruments) and social skills (communication and cooperation

skills, emotional intelligence and other).

33. Specific competencies:

Competencies that are directly related to the tasks of the occupation in the workplace context. They refer to concrete, practical, and focused aspects

34. Traineeship: A system of vocational training combining off-the-job training at an approved training provider with on-the-job training and practical work

experience. Traineeships generally take one to two years and are now a part of the New Apprenticeships system.

35. Unit of competency: A component of a competency standard. A unit of competency is a statement of a key function or role in a particular job or occupation. See also element of competency, performance criteria, range of variables.



Employable Skills for Sustainable Job Creation

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