



Republic of Rwanda
Ministry of Education



CURRICULUM STRUCTURE

RQF LEVEL

4

TVET CERTIFICATE IV in FORESTRY

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Kigali, June 2023

TVET CERTIFICATE IV

in
Forestry

Supported by



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List of Abbreviations

4IR	Fourth Industrial Revolutions
AI	Artificial Intelligence
BPO	Business Process Outsourcing
CAD	Computer Aided Design
CDU	Curriculum Development Unit
CM	Complementary Modules
CV	Curriculum Vitae
DACUM	Developing a Curriculum
ESSP	Education Sector Strategic Plan
HR	Human Resources
IAP	Industrial Attachment Program
IOT	The Internet of Things
MINEDUC	Ministry of Education
NST	National Strategy for Transformation
NSDEPS	National Skills Development and Employment Promotion Strategy
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
PSDYES	Private Sector Development & Youth Employment Strategy
REQF	Rwandan Education Qualification Framework
RP	Rwanda polytechnic
SWOT	Strength Weakness Opportunities and Treats
TSS	Technical Secondary School
SDC	Swiss Agency for Development and Cooperation
TVET	Technical and Vocational Education and Training
WDA	Workforce Development Authority
WHS	Work Health & Safety
WPL	Workplace learning
SMAW	Shielded metal arc welding
RTB	Rwanda TVET Board

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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, therey were barriers in vertical mobility and pathways in TVET which resulted in negative TVET perception. Furthermore, they 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 agriculture among others. In this respect, Rwanda TVET Board, in collaboration with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, is honoured to avail the revised curriculum of Forestry 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.

Dipl. _ Eng. Paul UMUKUNZI

Director General/ RTB

1. GENERAL INTRODUCTION

The curriculum presents a coherent and significant set of competencies to acquire in order to perform the occupations of a **Tree Nursery Supervisor and Silviculture Supervisor**. 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 training.

The modules of the curriculum include a description of the expected results at the end of training. They have a direct influence on the choice of the theoretical and practical learning activities. The competencies are the targets of training and 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 on the basis of this document.

The curriculum consists of three parts. The first part is of general interest and shows the nature and goals of a 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 attitude) and the learning contents related to each learning unit. Also, the learning activities and resources for learning are suggested.

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

2. QUALIFICATION DETAILS

2.1. Description

Title:	TVET Certificate IV in Forestry
Level:	RQF Level 4
Credits:	130
Sector:	Agriculture and Food Processing
Sub-sector/trade:	Forestry
Issue date:	June, 2023

Note: The 130 credits are corresponding to the total of notional learning hours (1300 hours make $32\frac{1}{2}$ weeks of effective teaching and learning in TVET setting and company). Notional learning hours include direct contact time with trainers and workplace learning facilitators ('directed learning'), time spent in studying, doing assignments, and undertaking practical tasks ('self-directed'). It is included also the time of summative assessment (Workplace Comprehensive-, Integrated- and End Level Assessment) which is conducted at company in collaboration with the school.

2.2 Graduate profile

The purpose of this qualification is to allow learners access to the forestry sector with specific reference to **Supervision of Tree Nursery and silvicultural activities**. This qualification will allow qualifying learners to become economically active in forestry practices that will have a direct impact on local economic development through the production of wood and non-wood forest products, improving household access to energy.

Level 4 in forestry is an introductory qualification to acquire the necessary competence to participate as part of a working team, performing the silvicultural and Nursery operations as applicable to forestry production in a closely defined context and under minimum supervision.

The learner will be able to carry out repetitive procedures in a predictable environment and will be able to adhere to the relevant safety, quality, hygiene and technical standards.

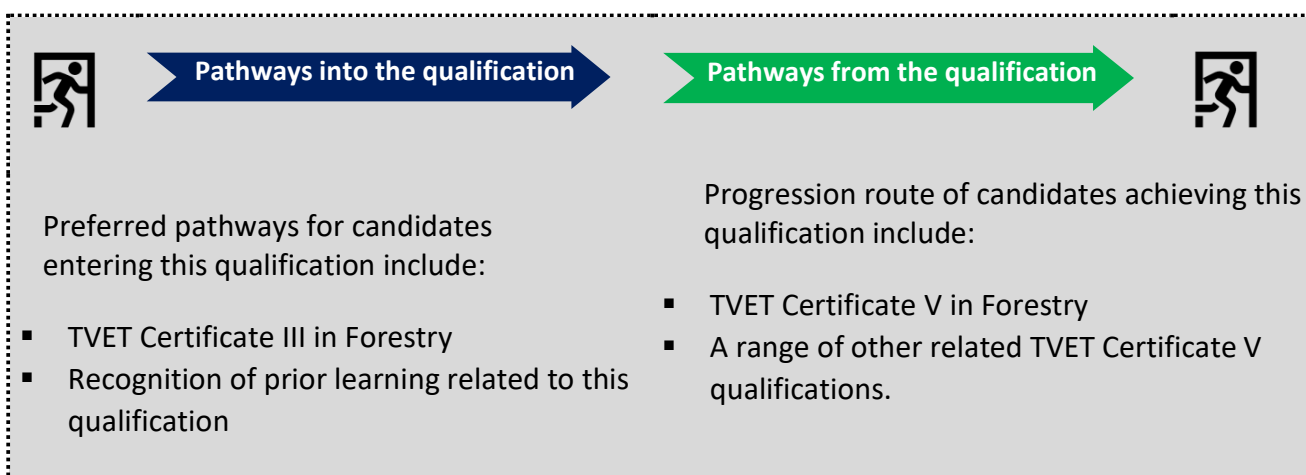
The learner will be able to take responsible decisions within a limited range based on a sound understanding of the basic principle's good environmental practices.

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

1. Describe tree Species
2. Apply basic principles of Agroforestry
3. Conduct Forest Protection
4. Conduct Forest Harvesting
5. Implement Forest Policy, laws and regulations
6. Apply fundamentals of Forest Inventory
7. Perform vegetative propagation
8. Apply Basic Knowledge of Soil Science
9. Apply Fundamental Mathematical Analysis
10. Develop a business plan
11. Apply computer skills
12. Citizenship
13. Use intermediate English at workplace
14. Gukoresha Ikinyarwanda kiboneye
15. Exprimer des opinions en français élémentaire
16. Apply Mechanics and properties of matter
17. Demonstrate knowledge of Organic Chemistry
18. Demonstrate knowledge of General Biology
19. Integrate the workplace

2.3 Minimum entry requirements and pathways

The minimum entry requirement to this qualification is to be physically and mentally fit with broad knowledge, skills and attitude of agriculture background.



2.4 Rationale of the Qualification

The general population in Rwanda heavily depends on forest services, as forests help prevent land degradation and provide watershed protection, thus making agriculture viable. A majority of the Rwandan population work in agriculture and over 96 % of them use wood as a major source of domestic energy. The challenges in forestry sector include the effects of a changing climate, worsening fire seasons, epidemics of forest pests and diseases, lack of capacity to keep our forests healthy and resilient. Caring for forests takes work.

The National Forest Policy acknowledges the crucial role forests play for the livelihood of Rwandese people and governs a process of restoring degraded landscapes and protecting natural forests.

Key governance areas of the Forest Policy include strong institutions, sustainable forest management, private sector participation, woody biomass energy, forest ecosystem conservation, participatory forest management, agroforestry and trees outside forest development.

In 2019, Rwanda reached its goal of increasing forest cover to 30% of total land area one year ahead of plan despite continuing population and land pressures and is now aiming to fulfil its Bonn Challenge commitment of bringing 2 Mha under restoration by 2030.

The Rwandese people benefit from the restored forests through improved food security and poverty alleviation. This is due to the role that forests play in the prevention of land degradation and protection of watershed.

2.5 Job related information

This qualification prepares individuals to integrate the agriculture industry with the professionalization in forestry. This qualification again offers the opportunity to execute the works as Tree nursery Supervisor and Silviculture Supervisor while ensuring that safety, security and environmental regulations are respected.



Possible jobs related to this qualification:

- Silviculture Supervisor
- Tree nursery Supervisor

2.6 Information about competencies

No	Code	Complementary competencies	Credit
1	CCMBC402	Develop a business plan	3
2	CCMCL402	Apply computer skills	3
3	CCMCT401	Citizenship	3
4	CCMEN402	Use intermediate English at workplace	3
5	CCMKN402	Gukoresha Ikinyarwanda cy'umunyamwuga	3
6	CCMFT402	Exprimer des opinions en français élémentaire	3
Total			18

	No	Code	Core competencies	Credit
GENERAL	1.	GENSS402	Apply basic knowledge of soil science	6
	2.	FORPL402	Implement Forest Policy, laws and regulations	6
	3.	GENFA402	Apply Fundamental Mathematical Analysis	6
	4.	GENMP402	Apply Mechanics and properties of matter	4
	5.	GENAC402	Demonstrate knowledge of Organic Chemistry	3
	6.	GENAB402	Demonstrate knowledge of General Biology	3
SPECIFIC	7.	FORTS402	Describe tree Species	11
	8.	FORPA402	Apply basic principles of Agroforestry	11
	9.	FORFP402	Conduct Forest Protection	11
	10.	FORFH402	Conduct Forest Harvesting	9
	11.	FORFI402	Apply fundamentals of Forest Inventory	9
	12.	FORTP402	Perform tree vegetative propagation	11
	13.	FORIA402	Integrate the workplace	20
Total				110

- ❖ **Number of competencies: 21**
- ❖ **Core competencies :13**
- ❖ **Complementary competencies: 6**
- ❖ **The total number of Credits: 130**

2.7 Allocation of Learning Hours

N0	Module name	Learning Outcome	Theoretical hours	Practical hours	Total hours
1	Entrepreneurship	LO1. Identify elements of business plan	7	3	10
		LO2. Write a business plan	5	5	10
		LO3. Establish business contingency plan	4	3	7
		LO4. Present a business plan	1	2	3
		Total hours module 1			17
2	ICT	LO1. Describe the operating system	4	11	15
		LO2. Customize the computer features	3	7	10
		LO3. Protect computer system	2	3	5
Total hours module 2			9	21	30
3	Citizenship	LO1. Make a Comparative study of Genocides.	7	3	10
		LO2. Protect human rights	7	3	10
		L.O3. Promote Peace and social cohesion	7	3	10
Total hours module 3			21	9	30
4	English	L.O1. Write factual, descriptive, and explanatory correspondence text.	4	5	9

		L.O2. Apply a range of listening strategies and activities to understand predictable messages	4	3	7
		L.O3. Discussion, supporting or refute ideas on general and trade-related topics	3	4	7
		L.O4. Read medium texts on general and trade-related topics	4	3	7
Total hours module 4			15	15	30
5	Ikinyarwanda	L.O1. Gukoresha ubuvanganzo gakondo bufatiye ku mwuga ashyikirana n’abandi , gutandukanya ubwoko bw’inshinga no gukoresha ikomorazina n’ikomoranshinga .	6	4	10
		L.O2. Gukoresha Ikinyarwanda uwiga agaragaza ibyiza by’ikoranabuhanga mu iterambere ry’umwuga no gusesengura ibinyazina binyuranye.	2	3	5

		L.O3. Gukoresha Ikinyarwanda uwiga agaragaza ububi bw’ibiyobyabwenge mu rubyiruko, kugaragaza amategeko y’igenamajwi yerekeye n’ingombajwi mu izina mbonera no kunoza imyandikire y’inyuguti nkuru mu nteruro.	2	3	5
		L.O4. Gukoresha Ikinyarwanda uwiga agaragaza uburyo bunyuranye bwo gufata neza ibidukikije no gukoresha indangahantu n’ibyungo.	2	3	5
		L.O5. Gukoresha Ikinyarwanda uwiga agaragaza akamaro k’ubutabazi bw’ibanze no gukoresha impakanyu n’indango z’inshinga.	3	2	5
Total hours module 5			15	15	30
6	Français	L.O1. Préciser des informations,	6	5	11
		L.O2. Décrire des personnes et des lieux et exprimer ses goûts	4	4	8
		L.O3. Indiquer l’itinéraire.	5	6	11
Total hours module 6			15	15	30
7	Apply fundamental	LO1: Analyse algebraic functions	8	7	15

	Mathematical Analysis	LO2: Apply fundamentals of differentiation	10	10	20
		LO3: Apply exponential functions	7	8	15
		LO4: Apply logarithmic functions	5	5	10
Total hours module 7			30	30	60
8	Apply Mechanics and Properties of Matter	LO1: Describe laws of motion and their applications	3	1	4
		LO2: Apply static equilibrium and elasticity	4	4	8
		LO3: Analyse fluid mechanics	4	2	6
		LO4: Apply thermodynamics	4	5	9
		LO5: Examine effects of electric current flow in DC electric circuit	3	4	7
		LO6: Apply geometric instruments	3	3	6
Total hours module 8			21	19	40
9	Demonstrate Knowledge of Organic Chemistry	LO1: Explain organic compounds	8	2	10
		LO2: Discuss biochemical molecules	5	5	10
		LO3: Describe polymers	2	8	10
Total hours module 9			15	15	30
10	Demonstrate Knowledge of General Biology	LO1: Describe biological macromolecules structure and function	7	3	10
		LO2: Illustrate patterns of	7	3	10

		genetic inheritance			
		LO3: Distinguish various microbial structures and their importance	4	6	10
Total hours module10			18	12	30
11	Describe tree species	LO1: Identify forest species	10	25	35
		LO2: Identify agroforestry species	9	21	30
		LO3: Identify the categories of trees	10	25	35
Total hours module 1 1			29	71	100
12	Apply basic principles of agroforestry	LO1: Establish agroforestry systems	10	25	35
		LO2: Apply agroforestry practices	10	25	35
		LO3: Manage agroforestry practices	9	21	30
Total hours module 12			35	65	100
13	Conduct forest protection	LO1: Apply forest fire control techniques	9	21	30
		LO2: Control tree pest and diseases	15	35	50
		LO3: Apply forest guarding techniques.	3	7	10
Total hours module 13			27	63	90
14	Conduct Forest Harvesting	LO1: Prepare for forest harvesting activities	6	14	20

		LO2: Perform forest harvesting	10	25	35
		LO3: Restore harvested areas	9	16	25
Total hours module 14			25	55	80
15	Apply fundamental forest inventory	LO1: Identify preliminary works of forest inventory	10	15	25
		LO2: Carry out tree measurements and stand parameters	15	30	45
		LO3: Report forest inventory	3	7	10
Total hours module 15			30	50	80
16	Perform tree vegetative propagation	LO1: Perform grafting	9	21	30
		LO2: Perform layering/Marcottage	8	17	25
		LO3: Apply tree cuttings	3	7	10
		LO4: Perform tree tissue culture	5	10	15
Total hours module 16			25	55	80
17	Basic Knowledge of Soil Science	LO1: Describe soil formation process	6	14	20
		LO2: Describe physical properties of soil	6	14	20
		LO3: Describe chemical properties of soil	3	7	10
		LO4: Describe biological properties	3	7	10
Total hours module 17			18	42	60
18	Implement Forest	LO1: Apply forest policy	5	10	15

	Policy, law and regulations	LO2: Apply forest laws	5	10	15
		LO3: Apply forest rules and regulations	6	14	20
Total hours module 18			16	34	50
19	Integrate the workplace	LO1. Investigate and secure industrial attachment place	8	2	10
		LO2. Deal with industrial attachment challenges at workplace	7	3	10
		LO3. Get briefed on industrial attachment program	8	2	10
		LO4. Develop one’s competencies on the workplace	7	163	170
Total hours module 19			30	170	200
Total hours (All Modules)			408	775	1180

3. TRAINING PACKAGE

The training package includes 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.

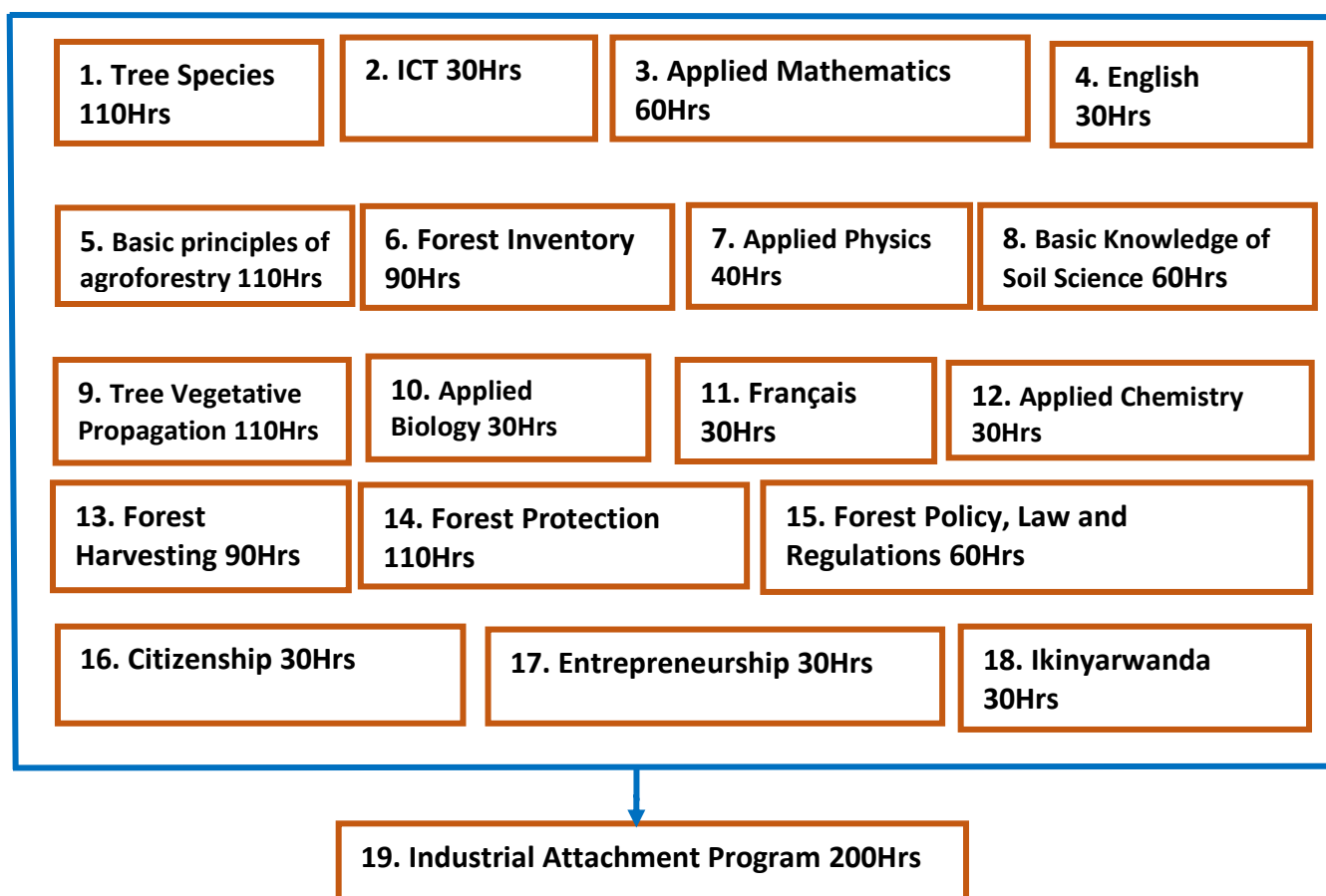


Figure Flowchart

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

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%

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

Assessment: A process of gathering and judging evidence in order to decide whether a person has attained a standard of performance.

Assessment criteria: Statements which describe performances and place them in context with sufficient precision to allow valid and reliable assessment.

Best practice: Management practices and work processes that lead to outstanding or top-class performance and provide examples for others.

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.

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.

Competency-based assessment (or CBA): The gathering and judging of evidence in order to

decide whether a person has achieved a standard of competency.

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.

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.

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.

Credit: The acknowledgement that a person has satisfied the requirements of a module.

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.

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.

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.

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.

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.

Generic modules: Modules leading to the attainment of complementary competencies.

Informal education: The acquisition of knowledge and skills through experience, reading, social contact, etc.

Internship: An opportunity for a learner to integrate career related experience by participating in planned, supervised work.

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.

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.

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.

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.

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.

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.

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

Module: A unit of training which corresponds to one competency and which can be completed on its own or linked to others.

Occupation: The principal business of one's life.

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.

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.

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.

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.

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).

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

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.

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