



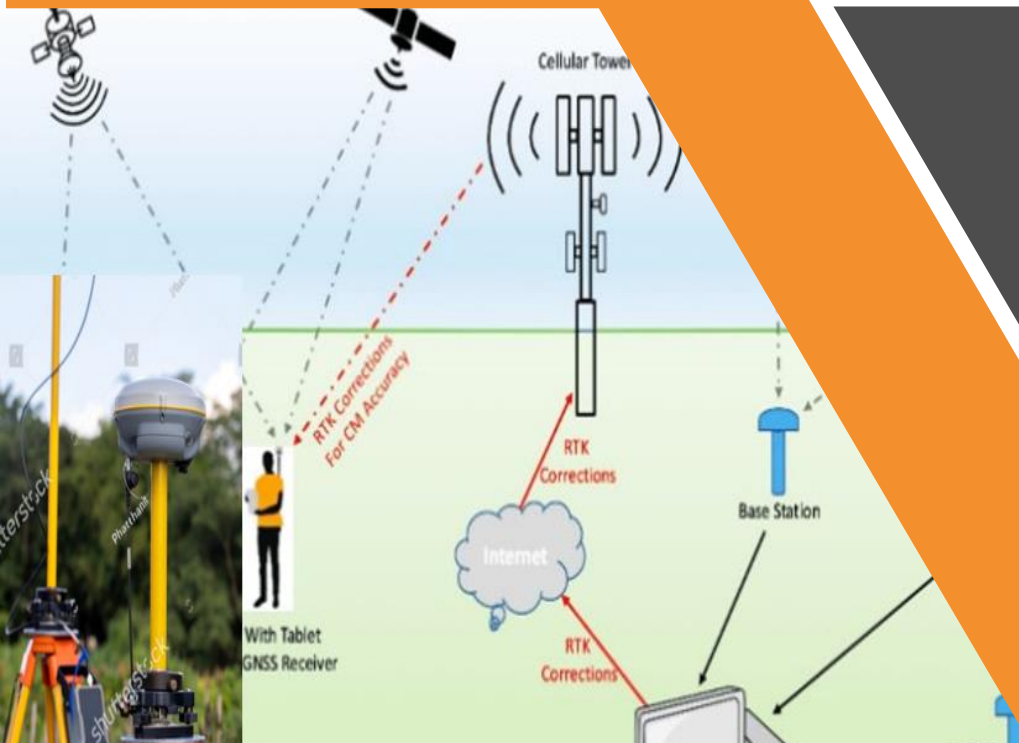
Republic of Rwanda  
Ministry of Education



## CURRICULUM STRUCTURE

RQF LEVEL

5



## TVET CERTIFICATE V in LAND SURVEYING

CBSLSV5002

Kigali, June 2024

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**CBSLSV5002 -TVET CERTIFICATE V**

**In Land Surveying**

**RQF Level 5 CURRICULUM**

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## List of Abbreviations

<b>CAD</b>	Computer Aided Design
<b>CDU</b>	Curriculum Development Unit
<b>CM</b>	Complementary Modules
<b>CV</b>	Curriculum Vitae
<b>DACUM</b>	Developing a Curriculum
<b>ESSP</b>	Education Sector Strategic Plan
<b>HR</b>	Human Resources
<b>IAP</b>	Industrial Attachment Program
<b>MINEDUC</b>	Ministry of Education
<b>NST</b>	National Strategy for Transformation
<b>NSDEPS</b>	National Skills Development and Employment Promotion Strategy
<b>OHS</b>	Occupational Health and Safety
<b>PPE</b>	Personal Protective Equipment
<b>PSDYES</b>	Private Sector Development & Youth Employment Strategy
<b>RQF</b>	Rwanda Qualification Framework
<b>RP</b>	Rwanda polytechnic
<b>SWOT</b>	Strength Weakness Opportunities and Treats
<b>TSS</b>	Technical Secondary School
<b>TVET</b>	Technical and Vocational Education and Training
<b>RTB</b>	Rwanda TVET Board
<b>WHS</b>	Work Health & Safety
<b>WPL</b>	Workplace learning
<b>SHE</b>	Safety, Health and Environment
<b>GIS</b>	Geographic Information System
<b>TQUM</b>	TVET Quality Management (Project)
<b>ROLS</b>	Rwanda Organization of Land Surveyor

## Acknowledgments

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## 2. General modules

No	Names	Position	Organization
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4	UMUGABEKAZI Yvette	Chemist	ADM-IBTC

## 3. Complementary modules

No	Names	Position	Organization
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3	UWERA Marceline	Socio-linguistics Officer	RALC
4	MUTAGANZWA Gilbert	Teacher	Ecole Secondaire de Rukara



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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 Land Surveying among others. In this respect, Rwanda TVET Board, in collaboration with ENABEL, is honoured to avail the revised curriculum of Land Surveying 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 acquire in order to perform the occupations of Construction Surveying Technician, Surveying Laboratory Technician, Mine Surveying Technician, Geo-Information Technician, Hydrographic Surveying 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 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

<b>Title:</b>	<b>TVET Certificate 5 in Land Surveying</b>
<b>Level:</b>	<b>RQF Level 5</b>
<b>Credits:</b>	<b>120</b>
<b>Sector:</b>	<b>Construction and Building Services</b>
<b>Sub-sector/trade:</b>	<b>Land Surveying</b>
<b>Issue date:</b>	<b>June, 2024</b>

**Note:** The 120 credits are corresponding to the total of notional learning hours (1,200 hours make 30 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

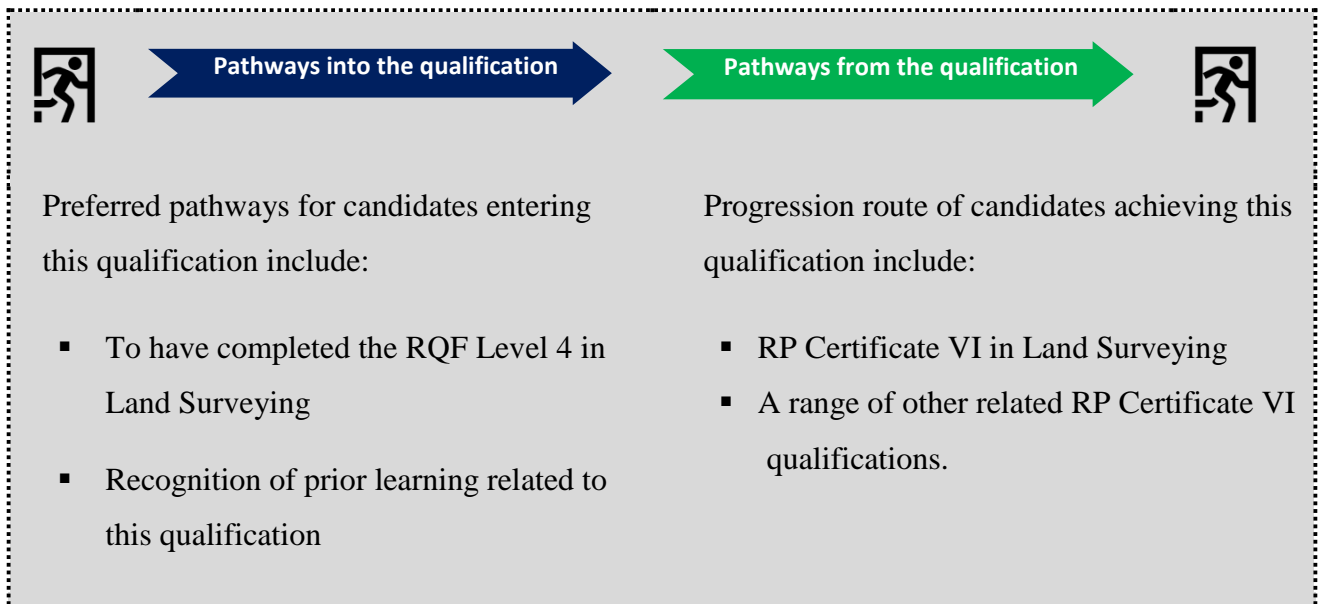
This qualification provides the skills, knowledge, and attitude for a learner to be competent in a range of routine tasks and activities that require the application of practical skills in a defined context. Work would be undertaken in various Land surveying and construction enterprises where surveying civil structures such as roads, bridges, buildings, pipelines, and power lines, as well as setting out these structures, producing plans, maps and charts and collecting surveying data for land, hydrographic, and mining are carried out. Learners may work with some autonomy or in a team but usually under close supervision.

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

1. Organise a Business
2. Apply ICT at Workplace
3. Gukoresha ikinyarwanda cy' intyoza
4. Use upper-intermediate English at workplace
5. Echanger les idées en Français élémentaire
6. Kutumia Kiswahili katika mawasiliano ya kazini
7. Apply Professional and multicultural ethics at workplace
8. Develop attitudes of living together in harmony
9. Apply Mathematical Analysis, Statistics and Probability
10. Apply Dynamics and Mechanical waves
11. Demonstrate basic knowledge of Ecology
12. Demonstrate basics of Analytical Chemistry
13. Apply land law and regulations
14. Perform surveying of civil structures
15. Perform mine surveying
16. Apply Remote Sensing Technology
17. Conduct hydrographic surveying
18. Perform cadastral surveying
19. Maintain surveying laboratory

### 2.3 Minimum entry requirements and pathways

The minimum entry requirement to this qualification is to have completed RQF Level 4 in Land Surveying



### 2.4 Rationale of the Qualification

Rwanda's Construction and building services industry has rapidly grown in the past couple of years with both government and private sector engaged in cadastral surveying and mapping as well as in the construction of buildings, roads, dams, water treatment plants and new fresh water supply lines, and other infrastructures triggering what is now dubbed as a "construction boom in Rwanda". The construction and building services industry contributes immensely towards the GDP of the Country mainly through direct income and massive employment opportunities generated from various cadastral and mapping projects, infrastructure projects, rehabilitation and maintenance. It is estimated that the construction and building services sector as the larger industrial sector contributes the highest to the country's industrial GDP. However, there has been a shortage in skilled surveyors to work in the various formentioned activities. As such skilled Construction Surveying Technician, Surveying Laboratory Technician, Mine Surveying Technician, Geo-Information Technician, and Hydrographic Surveying Technician are the key

occupations that need to be addressed to drive the target of the government in construction and building services sector.

## **2.5 Job related information**

This qualification prepares individuals to integrate into the construction and building services industry with the professionalization of surveying of civil structures, cadastral surveying, mine surveying, maintaining surveying laboratories, and hydrographic surveying. This qualification also offers the opportunity to execute works by applying remote sensing technology and applying land laws and regulations while ensuring that safety, security, and environmental regulations are respected.



### **Possible jobs related to this qualification:**

- ❖ **Construction Surveying Technician**
- ❖ **Surveying Laboratory Technician**
- ❖ **Mine Surveying Technician**
- ❖ **Geo-Information Technician,**
- ❖ **Hydrographic Surveying Technician**

## 2.6 Information about competencies

No	Code	Complementary competencies	Credit
1	CCMOB502	Organise a Business	3
2	CCMIW502	Apply ICT at Workplace	3
3	CCMKN502	Gukoresha ikinyarwanda cy' intyoza	3
4	CCMEN502	Use upper-intermediate English at workplace	3
5	CCMFT502	Echanger les idées en Français élémentaire	3
6	CCMKK502	Kutumia Kiswahili katika mawasiliano ya kazini	3
7	CCMPE502	Apply Professional and multicultural ethics at workplace	3
8	CCMCZ501	Develop attitudes of living together in harmony	3
<b>Total</b>			<b>24</b>

Co-Curricular activities		Credit
Sports/Clubs		1
Self-study/Library Research		1
<b>Total</b>		<b>2</b>



	No	Code	Core competencies	Credit
GENERAL	1.	<b>GENEP502</b>	Apply Mathematical Analysis, Statistics and Probability	<b>6</b>
	2.	<b>GENDM502</b>	Apply Dynamics and Mechanical waves	<b>4</b>
	3.	<b>GENAC502</b>	Applied Chemistry	<b>3</b>
	4.	<b>LSVLL502</b>	Apply Land Law And Regulations	<b>7</b>
SPECIFIC	5.	<b>LSVSS501</b>	Perform surveying of civil structures	<b>12</b>
	6.	<b>LSVMS501</b>	Perform mine surveying	<b>10</b>
	7.	<b>LSVRS502</b>	Apply Remote Sensing Technology	<b>8</b>
	8.	<b>LSVHS501</b>	Conduct hydrographic surveying	<b>7</b>
	9.	<b>LSVCS502</b>	Perform cadastral surveying	<b>10</b>
	10.	<b>LSVSL501</b>	Maintain surveying laboratory	<b>7</b>
	11.	<b>LSVIA502</b>	Integrate the workplace	<b>20</b>
Total				<b>94</b>

- ❖ Number of competencies: 19
- ❖ Core competencies :11
- ❖ Co-Curricular activities:2
- ❖ Complementary competencies: 8
- ❖ The total number of Credits: 120

## 2.7 Allocation of Learning Hours

N0	Module name	Learning outcome	Theoretical hours	Practical hours	Total hours
1	Surveying of civil structures	LO1:Plan the work	15 hours	15hours	30 hours
		LO2: Produce Plans and maps	10 hours	20 hours	30 hours
		LO3: Perform setting out	5 hours	25 hours	30 hours
		LO4: Perform as built survey	5 hours	25 hours	30 hours
Total hours module 1			35 hours	85 hours	120 hours
2	Cadastral surveying	LO1: Plan the work	10 hours	10 hours	20 hours
		LO2: Collect data	5 hours	25 hours	30 hours
		LO3: Produce cadastral plans	5 hours	25 hours	30 hours
		LO4: Perform boundary stake out	5 hours	15 hours	20 hours
Total hours module 2			25 hours	75 hours	100 hours
3	Mine surveying	LO1: Plan the work	10hours	20 hours	30 hours
		LO2: Collect mine surveying data	15 hours	25 hours	40 hours
		LO3: Produce mine Plans and maps	5hours	25 hours	30 hours
Total hours module 3			30 hours	70 hours	100 hours
4	Hydrographic surveying	LO1: Plan hydrographic surveying activities	5 hours	10 hours	15 hours
		LO2: Collect hydrographic surveying Data	10 hours	20 hours	30 hours
		LO3: Produce hydrographic charts	5 hours	20 hours	25 hours

Total hours module 4			20 hours	50 hours	70 hours
5	Surveying laboratory maintainance	LO1: Organize surveying lab	5 hours	10 hours	15 hours
		LO2: Calibrate the instruments	5 hours	20 hours	25 hours
		LO3: Repair the instruments	5 hours	25 hours	30 hours
Total hours module 5			15 hours	55 hours	70 hours
6	Remote Sensing Technology	LO1: Plan the work	5 hours	15 hours	20 hours
		LO2: Collect remote sensing data	5 hours	25 hours	30 hours
		LO3: Produce maps and models	5 hours	25 hours	26 hours
Total hours module 6			15 hours	65 hours	80 hours
7	Land Law And Regulations	LO1: Describe law governing land	40 hours	0 hours	40 hours
		LO2: Interpret land management policies and regulations	10 hours	5 hours	15 hours
		LO3: Apply land surveying regulations	10 hours	5 hours	15 hours
Total hours module 7			60 hours	10 hours	70 hours
Total hours modules of core modules			200 hours	410 hours	610 hours

### **3. TRAINING PACKAGE**

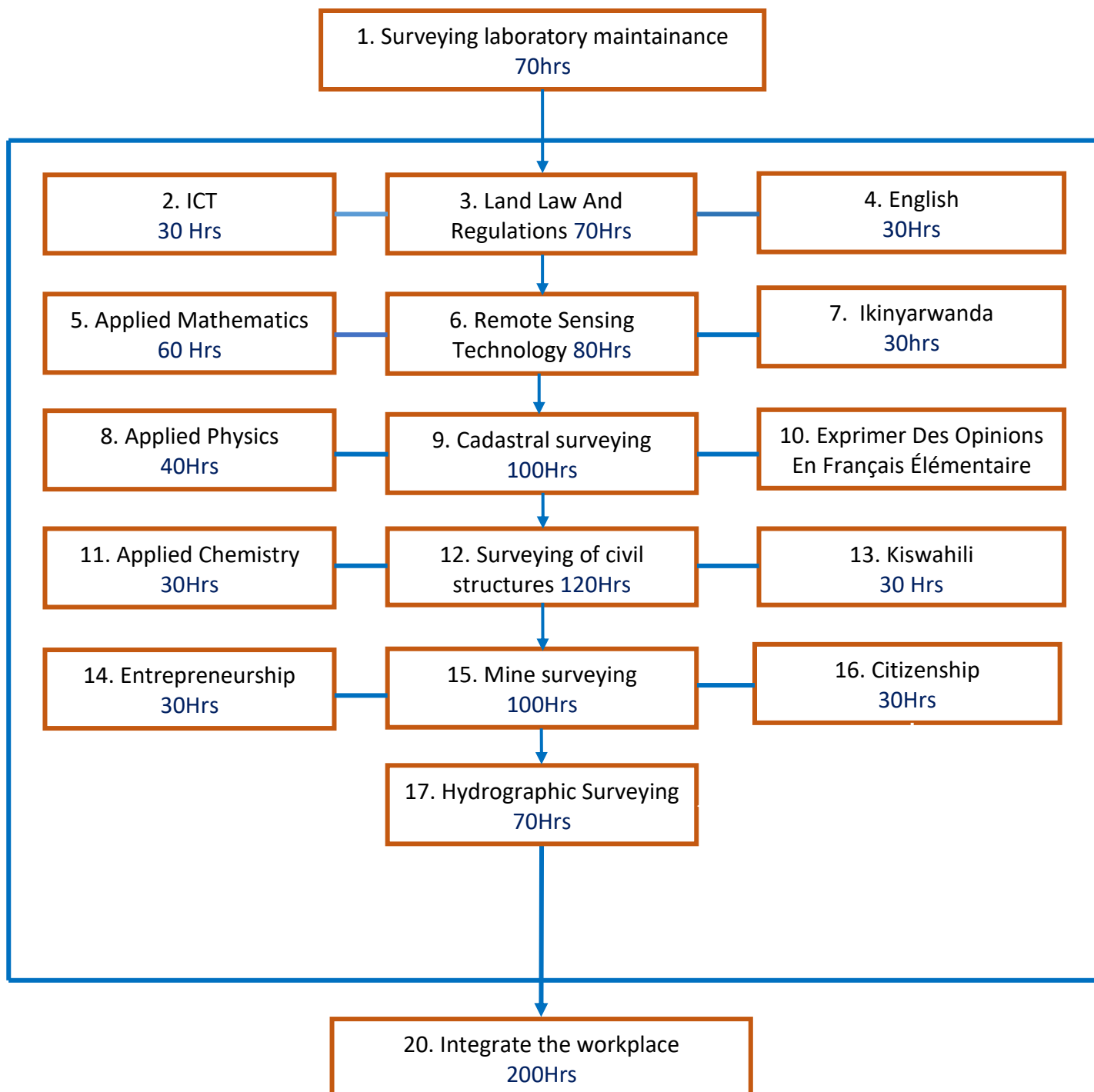
The training package includes the flowchart, the modules, the course structure, and the assessment guidelines.

#### **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.



*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*

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