

## **INSTITUT SUPERIEUR DE TECHNOLOGIES**

Sarl au capital de 10 000 000

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Diplômes reconnus par le CAMES

Vingt (20) ans au service de la formation des ressources humaines

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### **Bachelor of Engineering in Land Surveying**

#### **1. TITLE OF PROGRAMME**

The programme shall be Bachelor of Engineering in LAND SURVEYING **B.Eng. (BELS)**

#### **2 PREAMBLE**

##### **2.1 Background**

Bachelor of Engineering (Honours) (Surveying) is a four-year, full-time degree that'll help you develop the expertise to work side by side with Construction professionals and Infrastructure Engineers in urban and rural environments. Surveying is using a range of techniques to map the natural and built environments. Surveying land has been the basis of all civilisations which have built or farmed on land. Surveying is still a fundamental aspect of every piece of architecture, infrastructure, rural, urban or mining development.

Surveyors work alongside other engineers, architects and land developers to define legal land boundaries and provide essential engineering support for urban development, large infrastructure projects, the development and operation of mines and the management of the environment and resources.

In this degree you'll learn how to use a range of high-tech surveying tools such as GPSs, laser scanners, mapping drones and surveying robots to create high definition 3D models of the built and natural environment. You'll also learn how to apply maths and powerful software to deliver products for a range of applications. To get you work ready, you'll apply these skills through 60-days of approved industry training.

##### **2.2 Justification**

The Surveying Engineering major provides a basic undergraduate education required for private and public service in the profession of surveying. Particular emphasis is placed on fundamental surveying principles required in all areas of surveying. Instruction is provided in the main divisions of surveying, including land surveying, mapping, photogrammetry, data analysis and adjustment, geodesy and map projection coordinate systems, remote sensing, geographic information systems, and land development.

Students study various data collection techniques using surveying tools including total stations, levels, softcopy photogrammetry, satellite imagery, and the global navigation satellite system (GNSS). They also study legal principles related to land surveying, professional ethics, applications for Geographic Information Systems (GIS) in surveying, and data management techniques. Through the use of projects and capstone courses students will design measurement systems, alignments, land information systems, and land development.

A Bachelor degree takes approximately four years to complete, with some students taking as few as three or as many as six years. This coursework can offer in-depth knowledge of a field related to science and evidence-based methodology. You'll get to choose a targeted final year thesis project, many times in conjunction with an external industry partner. Your thesis will help you understand real-world industry needs and form crucial professional networks you can leverage after graduating. Your thesis project will also help you develop sought-after research skills and let you broaden your knowledge in an area that sparks your interest.

### **2.3 Target Group**

The targeted group includes holders of:

Advanced Level Certificate of Education;  
Diplomas in Engineering and other related Science and Technology fields;  
Degrees in the Physical Sciences.

## **3. Programme Objectives**

### **3.1. General Objectives**

The Surveying Engineering Technology program is a surveying program that focuses on the skills and education required for professional practice. Starting with a basic grounding in mathematics and the physical sciences, the student is concurrently and progressively taught a combination of surveying, practical engineering, and business.

### **3.2. Specific Objectives**

Bachelor of Science in Surveying Engineering Technology is designed in conjunction with the Society of Professional Land Surveyors to meet the increasing demand for professional land surveyors. This is a four-year degree required to become licensed as a Professional Land Surveyor in IST BURKINAFASO. Instruction in the IST BURKINAFASO surveying engineering bachelor degree program emphasizes theoretical principles as well as practical applications of advanced surveying techniques and related computational procedures, geodesy, map compilation and photogrammetry, business aspects of operating a surveying firm, geographic information systems (GIS) and planning and conducting surveys.

The courses in a land surveying degree program provide students with an educational background in geographical land formations as well as a technical understanding of how to map those formations. Core courses might include:

- ❖ Surveying
- ❖ Geographic information systems
- ❖ Land or road development and design
- ❖ Legal aspects of land surveying
- ❖ Applied fluid mechanics
- ❖ Photogrammetry

**Duration of the Programme:** 4 years and one Year for advanced Diploma student

**Programme Structure**

<b>Courses codes</b>	<b>Courses Names</b>	<b>Credit Units</b>
	<b>Year one</b>	
	<b>Semester one</b>	
BBA111	Introduction to research science	4
BSC119	Communication skills	4
BELS110	Engineering mathematics	4
BELS112	Physics (theories and lab)	4
BELS102	Earthquake resistant building	4
BELS100	Working drawing	5
BELS113	Geosciences	5
	<b>Semester Two</b>	
BELS114	Geographic Information Systems	4
BELS210	Introduction to Exploration Geophysics	4
BELS211	Ethics and professional engineering	4
BELS221	coastal engineering	3
BELS222	Computer application	5
BELS224	Structural Dynamics and Earthquake Engineering	5
BELS223	Field work	5
		<b>60</b>
	<b>Year Two</b>	
	<b>Semester one</b>	
BELS225	Computer aided design I and II	4
BELS229	Engineering drawing	4
BELS226	Materials and methods of building construction	4
BELS227	Advanced Materials Technology	4
BELS228	Time Series Data Analysis for Geophysical Applications	4
BELS200	Retaining Structures and Slopes	5
BELS201	Engineering Behavior of Soils	5
		30
	<b>Semester Two</b>	
BELS202	Numerical Methods in Geotechnical Engineering	4
BELS203	Pavement Engineering	4
BELS204	Legal aspects of land surveying	4
BELS222	Slope Instability	4
BELS221	Advanced Foundation Engineering	4
BELS231	Geotechnical Models and Site Investigation	5
BCEE232	Structural Stability	5
		<b>60</b>
	<b>Year Three</b>	
	<b>Semester One</b>	

BBA312	Steel and Composite Structures	3
BELS313	Computational Structural Mechanics	3
BELS314	Deformation Monitoring Surveys	4
BELS315	Ground Improvement & Monitoring Techniques	4
BELS327	Geomechanics	4
BELS326	Structural Dynamics	4
BELS320	Rock & Slope Engineering	4
BELS321	Transportation Applications of Geophysics	4
	<b>Semester Two</b>	
BELS322	Surface Waves (MASW) and Ground Penetrating Radar (GPR)	5
BELS323	Ground Retaining Structures	5
BELS410	Surveying	5
BELS329	Geotechnical Analysis	5
BELS327	Surface Waves (MASW) and Ground Penetrating Radar (GPR)	5
BELS330	Ground Retaining Structures	5
		<b>60</b>
	<b>Year Four</b>	
	<b>Semester One</b>	
BELS330	Positioning	2
BELS429	Land Administration & Information Systems	2
BELS417	Geographical Information Systems	2
BELS411	Geodetic Surveying	2
BELS419	Surveying	2
BELS412	Landscape design	2
BELS413	Land Registry and Land Management II	2
BELS414	Land Law	2
BELS415	Field Astronomy	3
BELS416	Topographic Maps	3
BELS417	Territorial data Acquisition II	3
BELS418	Land Development	3
BELS419	Cadastral Surveying	3
BELS420	Terrestrial Photogrammetry	3
	<b>Semester Two</b>	
BELS421	Remote Sensing and Applications	2
BELS422	Real Estate Property Law	2
BBE427	Internship	4
BBE428	Thesis and Defense	20
		<b>60</b>
GCU		<b>180</b>