

Competence-based learning outcomes' course specifications (1<sup>st</sup> Semester 2022/2023)

<b>University:</b>	Benha University
<b>Faculty:</b>	Faculty of Engineering at Shoubra
<b>Department offering the program:</b>	Geomatics Engineering Department
<b>Program offering the course:</b>	Geomatics Engineering Program

### 1- Course Data (Basic Information)

<b>Course Code:</b> GED203	<b>Course Title:</b> Geodesy 1
<b>Semester/Year:</b> First / 2022-2023	<b>Specialization:</b> Geomatics Engineering
<b>Contact Hours:</b> 5	<b>Lecture:</b> 2 <b>Tutorial:</b> 1 <b>Lab:</b> 2

### 2- Course Aims

The aim of the course is to enable students to learn the principles of geodesy science and its application to earth studies, understand the effect of various geodetic terms on surveying observations and relate their knowledge about geodesy sciences to practical applications.

### 3- Course Contents

Definition of Geodesy-Difference between plane and geodetic survey – Figure of the Earth (Topographic – Geoid – Ellipsoid - Sphere) – Geometrical properties of the ellipsoid – Ellipsoidal and spherical excess -Calculating lengths along the meridian and parallel of latitude- Solution of spherical and ellipsoidal triangles - Direct and inverse geodetic problem – Establishing of horizontal and vertical datums - Observation and adjustment of geodetic horizontal control-Trigonometric and precise leveling.

### 4- Program Competences Served by the Course (A1, A5, A10, and B3)

#### Level (A) General Engineering Competences

*On completing this course, students will be able to:*

**A1** Identify, formulate, and engineering problems by applying engineering fundamentals, basic science, and mathematics.

**A5** Practice research techniques and methods of investigation as an inherent part of learning.

**A10** Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.

#### Level (B) Surveying Engineering Competences

*At the end of this course, the students will be able to:*

**B3** Recognize applications of all new advanced surveying techniques, eg. “Remote sensing, Photogrammetry, Global Positioning Systems and Geographical Information system”.

### 5- Learning Outcomes (LO's)

*At the end of the course, the student will be able to:*

Cognitive Domain	
LO1	Recognize the concept of geodesy.
LO2	Solve intersection and resection problems.
LO3	Explain the geometry of the figure of the earth.
LO4	Apply direct and inverse problems.
LO5	Evaluate the Orthometric heights and use it to compute geodetic heights.
LO6	Use the total station in observing well-conditioned figures
Psychomotor Domain	
LO7	Construct the coordinates of observed points /networks.
Affective Domain	
LO8	Select suitable points and techniques to compute the coordinates of unknown points.

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## 6- Mapping Learning Outcomes (LO's) with competences

LO's	NARS	A1	A5	A10	B3
LO1		■			
LO2		■			
LO3		■			
LO4		■			
LO5			■		■
LO6				■	
LO7			■		
LO8					■

## 7- Lecture Plan

Topics to be covered weekly & Matrix of LO's

Week	Topics	Planned Hours	Learning Outcomes							
			LO1 A1	LO2 A1	LO3 A1	LO4 A1	LO5 A5-B3	LO6 A10	LO7 A5	LO8 B3
W1	Concept of geodesy	4	■							
W2	Figure of the earth	4			■					■
W3	Geoid and ellipsoid concept	4	■							
W4	Geoid and ellipsoid computation	4		■						■
W5	Geodetic calculations	4							■	
W6	Solution of spherical and ellipsoidal triangles	4		■					■	■
W7	Systems of heights	4					■			
W8	Mid Term Exam						■			
W9	Well-conditioned figures and strength of figures	4			■			■		
W10	Resection and Intersection	4		■					■	■
W11	Direct problems	4				■			■	■
W12	Inverse problems	4					■		■	■
W13	Precise leveling	4				■				
W14	Trigonometric levelling	4				■				

## 8) Teaching and Learning Methods

Learning Outcomes		Teaching and Learning Methods									
		Face-to-face Lecture	Online Lectures	Tutorial / Exercise	Group Discussions	Laboratory	Self-Reading	Presentation	Collaborate Learning (Team Project)	Research and Reporting	Brain Storming
Cognitive Domain	LO1	●		●	●					●	●
	LO2	●		●	●		●			●	
	LO3	●		●	●					●	●
	LO4	●		●	●					●	
	LO5	●		●	●		●			●	
	LO6	●		●	●					●	
Psychomotor Domain	LO7	●		●	●		●			●	●
Affective Domain	LO8	●		●	●					●	●

### Student Academic Counseling and Support

- Students are directed to contact teaching staff for academic support during specific office hours.
- There are no disabled students in the program, thus no special support is needed.

## 9- Student Assessment

### a) Student Assessment Methods

Learning Outcomes		Assessment Methods									
		Written Exams	Online Exams	Oral Exam	Pop Quizzes	In-class Problem Solving	Take-Home Exam	Research Assignments	Reporting Assignments	Project Assignments	In-class Questions
Cognitive Domain	LO1	●		●		●			●		●
	LO2	●		●		●			●		
	LO3	●		●	●	●			●		●
	LO4	●		●		●			●		
	LO5	●		●	●	●			●		
	LO6	●		●		●			●		
Psychomotor Domain	LO7	●		●	●	●			●		●
Affective Domain	LO8	●		●	●	●			●		●

### b- Assessment Schedule and Weight

Assessment Tool	Week	Weight
Midterm Examination	8	30 %
Final Examination	(As Scheduled)	50 %
Quizzes	3,5,9	10 %
Home assignments, and Reports	2,4,6,8,10,12	10%
<b>Total</b>		<b>100 %</b>

## 10- Facilities

The following facilities are needed for this course:

- |   |                                      |   |
|---|--------------------------------------|---|
| <input type="checkbox"/> Classroom            | <input type="checkbox"/> Smart Board | <input type="checkbox"/> Computer with software |
| <input type="checkbox"/> Lecture Hall         | <input type="checkbox"/> White Board | <input type="checkbox"/> MIS system             |
| <input type="checkbox"/> Sound and Microphone | <input type="checkbox"/> Data Show   | <input type="checkbox"/> Internet Access        |
| <input type="checkbox"/> Other: .....         |                                      |   |

## 11- List of References

### a- Course Notes

Course notes prepared by instructor.

### b- Books

1- Hooijberg, M., 2007. Geometrical Geodesy: Using Information and Computer Technology. Springer-verlag, Berlin, Germany.

- **Course Coordinator:** Prof. Dr. Ali Ahmed ElSagheer

**Signature:**

**Dr. Reda Fekry**

**Signature:**

- **Program Coordinator:** Prof. Dr. Mahmoud Salah

**Signature:**