

Competence-based learning outcomes' course specifications (2nd Semester 2021/2022)

University:	Benha University
Faculty:	Faculty of Engineering at Shoubra
Department offering the program:	Geomatics Engineering Department
Department offering the course:	Geomatics Engineering Department

1- Course Data (Basic Information)

Course Code: GED308	Course Title: Geodesy (3)
Semester/Year: SECOND / 2022-2023	Specialization: Geomatics Engineering
Credit Hours: 5	Lecture: 2 Tutorial: 1 Lab: 2

2- Course Aims

For students undertaking this course, they will be able to:

- 1) Understand the Basic principles of satellite geodesy and satellite orbit ,Different geodetic satellite missions, Kepler laws ,and Satellite orbital parameters
- 2) Understand Global Navigation Satellite System (GNSS) , GPS methodology ,and static and kinematic observational techniques.
- 3) Study Relative and absolute point positioning ,IGS stations ,and PPP technique.
- 4) Study inertial Navigation System (INS).
- 5) Know the methods of monitoring crustal movements.

3- Course Contents

Basic principles of satellite geodesy and satellite orbit- Different geodetic satellite missions- Kepler laws – Satellite orbital parameters – Global Navigation Satellite System (GNSS) - GPS methodology - static and kinematic observational techniques- Relative and absolute point positioning – IGS stations - PPP technique - Introduction to inertial Navigation System (INS). Methods of monitoring crustal movements

4- Program Competences Served by the Course (A1, A2, A5. B1, B2 and B3)

Level (A) Engineering Competencies

On completing this course, students will be able to:

- A1** Identify, formulate, and engineering problems by applying engineering fundamentals, basic science and mathematics.
- A2** Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
- A5** Practice research techniques and methods of investigation as an inherent part of learning.

Level (B) Geomatics Engineering Competencies

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

- B1** Apply the knowledge of mathematics, engineering sciences, information technology and project planning.
- B2** Select the suitable tools and different technologies of data gathering for Geomatics works according to the required accuracy.
- B3** Recognize applications of all new advanced Geomatics techniques, e.g., “Remote sensing, Photogrammetry, Global Positioning Systems and Geographical Information system”.

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5- Learning Outcomes (LO's)

Cognitive Domain	
LO1	Recognize the different types of coordinate systems.
LO2	Solve the relation between different types of C.S.
LO3	Explain the gravimetric effects of geodetic observations.
LO4	Apply the different techniques of transformation parameters.
LO5	Evaluate the best fitting ellipsoid and datum shift.
LO6	Use keplerian parameters to determine satellite position
Psychomotor Domain	
LO7	Define the different types of traditional Egyptian networks
Affective Domain	
LO8	Practice the modern techniques by satellite position in geodesy

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

LO's NARS	A1	A2	A5	B1	B2	B3
LO1	■	■		■	■	
LO2	■			■		
LO3	■					
LO4		■	■	■		
LO5		■				
LO6				■		
LO7			■			
LO8			■		■	■

7- Lecture Plan

Topics to be covered weekly & Matrix of Competencies

Week	Topics	Course Competencies					
		A1	A2	A5	B1	B2	B3
1	introduction	√			√		
2	Basic principles of satellite geodesy and satellite orbit	√	√		√		
3	Different geodetic satellite missions		√	√	√		
4	Kepler laws- Satellite orbital parameters	√	√		√		
5	Global Navigation Satellite System (GNSS)		√		√		
6	GPS methodology		√		√	√	
8	static and kinematic observational	√					

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	techniques						
9	Relative and absolute point positioning		√			√	
10	GS stations	√			√	√	√
11	PPP technique	√					√
13	Introduction to inertial Navigation System (INS).		√		√		√
14	Methods of monitoring crustal movement					√	√

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.

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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	7	20 %
Final Examination	(As Scheduled)	50 %
Quizzes	3,5,9	10 %
Home assignments, and Reports	2,4,6,8,10,12	20%
Total		100 %

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10- Facilities

The following facilities are needed for this course:

- | | | |
|------------------------|---------------|--------------------------|
| ■ Classroom | □ Smart Board | ■ Computer with software |
| ■ Lecture Hall | ■ White Board | ■ MIS system |
| ■ Sound and Microphone | ■ Data Show | ■ Internet Access |
| ■ Other: | | |

11- List of References

a- Course Notes

- 1- Course notes prepared by instructor

b- Books

1. Guochang Xu, 2007. GPS Theory, Algorithms and Applications, 2nd edition, Springer, Germany.
2. Hofmann-Wellenhof, B., Lichtenegger, H. and Collins, J., 2003. GPS Theory and Practice. Springer-Verlag, UK.

c- Recommended Books

1. Günter Seeber, 2003. Satellite Geodesy, 2nd edition, Walter de Gruyter, Berlin.

- **Course Coordinator:** Prof. Dr. Ahmed Shaker

Signature:

Dr. Ahmed Abdel-Hay

Signature:

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