Department of Geomatics Engineering / Department of Geomatics Engineering / Department of Geomatics Engineering

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
GE205	GNSS SURVEYING	2.00	1.00	0.00	3.00	5.00

Course Detail

Course Language	:	English
Qualification Degree	:	Bachelor
Course Type	:	Compulsory
Preconditions	:	Available
Objectives of the Course	:	3D coordinates on earth's surface can be acquired by measuring signals emitted from satellites moving in special orbits in the Earth's gravity field. Depending on the hardware (e.g. mobile phone, geodetic antenna-receiver) and on the infrastructure (real and virtual reference station) one can reach positioning accuracies from m to mm level. For satellite positioning several topics from physics, mathematics, statistics, electronics, etc. should be understood and synthesized. The course will deliver these concepts to the student.
Course Contents	:	Introduction, GNS systems, coordinate systems, satellite orbits, signal structure, observables, mathematical model for positioning, data processing, coordinate transformation, field survey.
Recommended or Required Reading	:	1. Hofmann-Wellenhof, B., Lichtenegger, H. and Wasle, E. (2008) GNSS- Global Navigation Satellite Systems: GPS, GLONASS, Galileo & more, Wien, Springer. 2. Kahveci, M., Yıldız, F. (2022) GNSS Uydularla Konum Belirleme Sistemleri Teori-Uygulama, 11. basım, Nobel Akademik Yayıncılık, Ankara 3. Kahveci, M., (2017) Kinematik GNSS ve RTK CORS Ağları, 2. basım, Nobel Akademik Yayıncılık, Ankara
Planned Learning Activities and Teaching Methods	:	Lectures with slides, computer programming lab.
Recommended Optional Programme Components	:	Basic physics, mathematics, statistics, and linear algebra knowledge
Instructors	:	Dr. Öğr. Üyesi Mehmet Güven Koçak
Instructor's Assistants	:	NA
Presentation Of Course	:	Slides, visual materials
En Son Güncelleme Tarihi:	:	2/3/2024 1:53:41 AM

Course Outcomes

Upon the completion of this course a student :

1 Perform simple calculations related to geographical, cartesian and polar coordinates.

2 Calculate the cartesian coordinates of a satellite using Keplerian orbital elements.

3 Identify errors affecting GNSS observables.

4 Write the mathematical models of absolute and relative positioning.

5 Estimate receiver coordinates by applying the least squares method to the positioning models.

Preconditions

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
GE201	ÖLÇME BİLGİSİ II	2.00	2.00	0.00	3.00	5.00

Weekly Contents

	Teorical	Practice	Laboratory	Preparation Info	Teaching Methods	Course Learning Outcomes
1.Week	*Introduction to GNSS and currently operating GNSS					
2.Week	*GNSS coordinate and time systems.					
3.Week	*GNSS signals					
4.Week	*GNSS observables and errors					
5.Week	*Mathematical model for absolute positioning					
6.Week		*Field work				
7.Week	*Mathematical model for relative positioning					
8.Week	*Mid-term exam					
9.Week		*Field work				
10.Week		*Data processing I				
11.Week		*Data processing II				
12.Week	*Coordinate transformation					
13.Week		*Data processing III				
14.Week	*Term review					

Assesment Methods %

1 Midterms : 30.000

2 Final : 50.000

3 Project : 20.000

ECTS Workload

Activities	Count	Time(Hour)	Sum of Workload
Vize / Midterms	1	1.00	1.00
Final / Final	1	1.00	1.00
Derse Katılım / Attending lectures	14	3.00	42.00
Ders Öncesi Biresysel Çalışma / Individual study before lecture	14	2.00	28.00
Ders Sonrası Biresysel Çalışma / Individual study after lecture	14	2.00	28.00
Ara Sınav Hazırlık / Preparation for midterm	1	10.00	10.00
Final Sınavı Hazırlık / Preparation for final	1	15.00	15.00
Proje / Project	1	35.00	35.00
		Total :	160.00
		Sum of Workload / 30 (Hour) :	5
		ECTS :	5.00

Program And OutcomeRelation

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11
L.O. 1	5	0	0	5	0	0	0	0	0	0	0
L.O. 2	5	0	0	5	0	0	0	0	0	0	0
L.O. 3	4	0	0	0	0	0	0	0	0	0	0
L.O. 4	5	0	0	0	0	0	0	0	0	0	0
L.O. 5	5	0	0	5	0	0	0	0	0	0	0