

Course Code	Course Name	Teorical	Practice	Laboratory	Credits	ECTS
GE304	ADJUSTMENT COMPUTATIONS	3.00	0.00	0.00	3.00	4.00
Course Detail						
Course Language	: English					
Qualification Degree	: Bachelor					
Course Type	: Compulsory					
Preconditions	: Not					
Objectives of the Course	: In geomatics, quantities that cannot be measured directly such as point coordinates, camera inner orientation elements, gravity are derived from raw direction, length and time measurements. Therefore, candidate engineers are expected to recognize the probabilistic-statistical properties of observations and parameters as well as to model the relationship between them. The course aims to present methods and tools for parameter estimation using linear models. Another important objective of the course is to provide the skills to evaluate observations, parameters derived from them and, if necessary, other derived quantities (e.g. area) with quality criteria.					
Course Contents	: Probabilistic and statistical concepts, observation errors, normal distribution, error propagation law, linear models, least squares method, statistical testing.					
Recommended or Required Reading	: Observations and Least Squares, E.M. Mikhail, IEP, 1976 Adjustment Computations: Spatial Data Analysis. C.D. Ghilani and P. Wolf. Wiley. 2010.					
Planned Learning Activities and Teaching Methods	: Lecture based instruction, problem solving sessions, individual project					
Recommended Optional Programme Components	: In order to be successful in this course, students are expected to use their previous knowledge of linear algebra, probability-statistics and programming effectively.					
Instructors	: Dr. Öğr. Üyesi Mehmet Güven Koçak					
Instructor's Assistants	: -					
Presentation Of Course	: Theoretical background and exercises.					
En Son Güncelleme Tarihi:	: 11/17/2023 12:30:14 AM					

Course Outcomes

Upon the completion of this course a student :

- 1 List the types of errors that may be encountered in geodetic measurements and explain their causes of occurrence.
- 2 Apply the error propagation law to a given geodetic problem
- 3 Build Gauss-Markov model for parameter estimation.
- 4 Solve Gauss-Markov model unknowns by least squares estimation.
- 5 Assess estimation results using quality criteria
- 6 Perform basic statistical hypothesis testing process.

Preconditions

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Weekly Contents

	Teorical	Practice	Laboratory	Preparation Info	Teaching Methods	Course Learning Outcomes
1.Week	*Introduction: background, justification					
2.Week	*Probabilistic and statistical concepts and definitions					
3.Week		*Observation errors with problem-solving session (PSS1)				
4.Week	*Distributions: Normal, Chi-square, Student, Fisher					
5.Week	*Error propagation law I					
6.Week		*Error propagation law II: PSS2				
7.Week	*Gauss-Markov Model (GMM)					
8.Week	*Mid-term exam					
9.Week	*GMM and Least squares estimation I					
10.Week		*LS estimation II: PSS3				
11.Week		*LS estimation III: PSS4				
12.Week		*LS estimation IV: 2d-3d coordinate transformation (PSS5)				
13.Week	*Confidence interval and statistical testing I					
14.Week		*Confidence interval and statistical testing II: PSS6				

Assesment Methods %

1 Mterms : 30.000
2 Project : 30.000
3 Final : 40.000

ECTS Workload			
Activities	Count	Time(Hour)	Sum of Workload
Derse Katılım / Attending lectures	13	3.00	39.00
Ara Sınav Hazırlık / Preparation for midterm	1	10.00	10.00
Vize / Midterms	1	0.00	0.00
Ders Sonrası Biresysel Çalışma / Individual study after lecture	13	3.00	39.00
Proje / Project	1	35.00	35.00
Final Sınavı Hazırlık / Preparation for final	1	10.00	10.00
Final / Final	1	0.00	0.00
			Total : 133.00
			Sum of Workload / 30 (Hour) : 4
			ECTS : 4.00

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	4	0	0	0	0	0	0	0	0	0	0
L.O. 2	4	0	0	5	0	0	0	0	0	0	0
L.O. 3	4	0	0	5	0	0	0	0	0	0	0
L.O. 4	4	0	0	5	0	0	0	0	0	0	0
L.O. 5	4	0	0	5	0	0	0	0	0	0	0
L.O. 6	4	0	0	5	0	0	0	0	0	0	0