	DEPARTMENT OF GEOMATICS ENGINEERING
	UNDERGRADUATE PROGRAM IN GEOMATICS ENGINEERING
	COURSE SYLLABUS

COURSE	Name	Adjustment Computation	
	Code	RM184412	
	Credits	3 (three)	
	Semester	IV (four)	

COURSE DESCRIPTION

In this course, students will learn about the concept and how to solve measurement errors, especially using the calculation of the least-squares adjustment and analyze the results of the calculation of errors. The material provided includes the concept of measurement and error and measurement correlations. Also, it will be discussed the concept of variance, covariance, cofactors in observation, the concept of the least square adjustment, which is the development of the concept of propagation law, and analysis based on error ellipse. Students are expected will have a learning experience and be able to think critically about the application of calculating the least square adjustment in geodesy field, specifically terrestrial measurement.

EXPECTED LEARNING OUTCOME

A	Able to apply mathematics, science, and engineering in the fields of geodesy, surveying, hydrography, remote sensing, photogrammetry, geographic information systems, and cadastral to gain a thorough. understanding of the principles of engineering.
C	Able to identify, formulate, analyze and solve problems in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.
D	Able to perform spatial data acquisition using modern measurement methods, geospatial data processing, using industry standard software, and making standard designs and analyzes in the fields of geodesy, surveying, hydrography, remote sensing, photogrammetry, and cadastral.
H	Able to work in inter-disciplinary and inter-cultural teams so they can compete at national and international levels.

COURSE LEARNING OUTCOME

1	Able to explain the concept of measurement and error in the field of Geomatics Engineering.
2	Able to explain and apply the concepts of error propagation and linearization in the field of Geomatics Engineering.
3	Able to explain and apply the concept of adjustment computation in a simple way and with the principle of the least squares in the field of Geomatics Engineering.
4	Able to explain the concept of least square adjustment of indirect observation and least square adjustment of oservation only
5	Able to apply least square adjustment of indirect observation in the field of Geomatics Engineering.
6	Able to apply least square adjustment of oservation only in the field of Geomatics Engineering.
7	Able to analyze the result of least square adjustment
8	Able to present the result of least square adjustment in the form of error ellipse

COURSE MATERIALS

1	Concept of measurements and errors
2	Correlation, varians-covarians, cofactor, and weight matrices
3	Error propagation and linierization
4	The concept of least-squares adjustment
5	Least square adjustment of indirect observation
6	Least square adjustment of oservation only
7	Distance, angle, and azimuth conditions and their linierizations
8	Application of least squares adjustment in the field of surveying
9	Pre-analysis of survey measurements
10	Error ellipse

PREREQUISITE

Mathematics 2, Statistics, Advance Terrestrial Mapping

REFERENCES

A.	Main References
1	Mikhail,E.M., 1976. Analysis and Adjustment of Survey Measurements. Dun DonnelleyPublisher New York.
2	Wolf, P.R., and C.D. Ghilani, 1997. Adjustment Computations, John Wiley & Sons, Inc.
3	Ghilani, C. C., 2017. Adjustment Computation: Spatial Data Analysis, John Wiley & Sons, Inc.
B.	Additional References
1	Harvey, B.R., 1994. Practical Least Square. Monograph 13, University of new south Wales
2	E-learning Hitung Perataan (share.its.ac.id)