



DEPARTMENT OF GEOMATICS ENGINEERING
UNDERGRADUATE PROGRAM IN GEOMATICS ENGINEERING
COURSE SYLLABUS

COURSE	Name	Geodesy Control Network
	Code	RM184518
	Credits	3 (three)
	Semester	V (five)

COURSE DESCRIPTION

In this course, basic geodetic concepts related to reference ellipsoids and coordinate systems will be studied as well as the basic concepts regarding triangulation, trilateration and triangulation network. Concepts of Horizontal Geodetic Control Network (JKGH) and Vertical Geodetic Control Network (JKGH) and also its realization on a local, national, regional and international scale will also be given in this course. Furthermore, the theories and procedures will be given in constructing horizontal and vertical geodetic control network, including how to design, calculate the strength of the network (strength of figure) and adjust the result based on unconstrained and constrained network.

EXPECTED LEARNING OUTCOME

B	Able to design survey and mapping activities using the latest technology in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.
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,
G	Able to plan, perform and evaluate the process of surveying and mapping activities using the latest technology in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.

COURSE LEARNING OUTCOME

1	Able to explain geodetic concepts related to the earth's mathematical model (reference ellipsoide)
2	Able to explain the concept of coordinate system and geodetic method of determining coordinates using various methods
3	Able to explain and apply the concept of horizontal and vertical control network in the field of geodesy / geomatics
4	Able to explain and identify the types of local, national and international geodetic control network
5	Able to explain and create horizontal geodetic control network design
6	Able to calculate the strength of the network configuration (strength of figure)
7	Capable of leveling unconstrained and constrained network using the least squares method
8	Able to carry out optimization and evaluation of the Geodesy Control Network
9	Able to apply the process of procurement and evaluation of geodetic control networks for various purposes (eg Deformation

COURSE MATERIALS

1	The basic concept of geodesy is related to the mathematical modeling of the earth in the form of reference ellipsoids and
2	Basic concepts (coordinate system, triangulation network, trilateration network, triangulation network)
3	Horizontal geodesy control network and vertical geodesy control network system
4	Local, National, Regional and International Geodetic Control Network (ITRF)
5	Horizontal Geodetic Frame Network Design
6	Calculate the strength of the network configuration (strength of figure)
7	Calculating leveling of unconstrained and constrained network with conditional alignment (geometry)
8	Calculates leveling of unconstrained and constrained network with parameter leveling
9	Geodetic Frame Network Optimization
10	Geodetic Frame Network for various special purposes (eg Deformation Monitoring)

PREREQUISITE

Advanced Terrestrial Mapping, Adjustment Computation

REFERENCES

A.	Main References
1	Vanicek, P. and E.J. Krakiwsky. 1986. Geodesy: the Concepts 2nd Ed. Amsterdam: Elsevier.
2	Torge, W. 2001. Geodesy. de Gruyter, Berlin
3	Ghilani, C. C and P. R. Wolf. 2015. Elementary Surveying: An Introduction to Geomatics. Pearson Prentice Hall, Inc.
4	Ghilani, C. C., 2017. Adjustment Computation: Spatial Data Analysis, John Wiley & Sons, Inc.
5	Wolf, P.R., and C.D. Ghilani, 1997. Adjustment Computations, John Wiley & Sons, Inc.
B.	Additional References
1	E-learning Jaring Kontrol Geodesi (share.its.ac.id)
2	Badan Informasi Geospasial, 2013, Naskah Akademik Sistem Referensi Geospasial Nasional, Datum Geodesi Nasional
3	Rapp, R.H., 1984, Geometry Geodesy, OSU, Departement of Geodetic Science and Surveying, Ohio State University