DEPARTMENT OF GEOMATICS ENGINEERING
UNDERGRADUATE PROGRAM IN GEOMATICS ENGINEERING
COURSE SYLLABUS

COURSE	Name	Physical Geodesy
	Code	RM184623
	Credits	3 (three)
	Semester	VI (six)

COURSE DESCRIPTION

In this course, students will study one of the main objectives of geodesy, namely the determination of the shape and size of the Earth through gravity measurements. Basic theory about gravity and the methods of measurement and reduction will be given so that students will know how the characteristics and data acquisition for determining the shape and size of the Earth. Students will be given tasks such as perform simple calculations to model the shape and size of the Earth in order to understand and gain experience in determining the shape and size of the Earth. Earth dynamics phenomena that affect variations in the shape and size of the Earth will also be introduced in this course. Students will be stimulated to think critically about the use of Earth's shape and size models in practical use in the field of surveying and mapping.

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.
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, 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 main objectives of geodetic science in terms of determining the shape and size of the Earth.
2	Able to explain basic theories and measurement methods to determine the shape and size of the Earth.
3	Able to perform simple calculations to determine the shape and size of the Earth.
4	Able to explain the physical dynamics of the earth and its influence in determining the shape and size of the Earth.
5	Able to apply the use of Earth's shape and size models for practical purposes in the field of surveying and mapping based on their understanding of the theoretical basis and application of the shape and size of the Earth.

COURSE MATERIALS

1	Basic theory of geopotential
2	Normal gravity / Reference gravity
3	Gravity anomaly
4	Height systems dan Coordinate systems
5	Gravity observation and measurements, reduction of gravity value to a reference field
6	Earth gravity model
7	Geoid determination using Stokes Integral
8	The influence of the dynamics of the Earth to Earth's gravity field

PREREQUISITE

Advanced Terrestrial Mapping, Global Navigation Satellite System Survey

REFERENCES

A.	Main References
1	Bomford, G. 1980. Geodesy, Oxford University Press, Oxford
2	Heiskanen, W.A. and H. Moritz.1967. Physical Geodesy. Freeman, San Fransisco
3	Hofmann-Wellenhof, B. and H. Moritz. 2005. Physical Geodesy. Vienna: Springer
4	Torge, W. 2001. Geodesy. de Gruyter, Berlin
5	Vaníček, P. and E.J. Krakiwsky.1986. Geodesy: the Concepts. 2nd ed. Amsterdam: Elsevier
6	Torge, W. 1989. Gravimetry. de Gruyter, Berlin
7	Chuji Tsuboi. 1979. Gravity, Allen & Unwin, London
8	Garland, G.D.1977. The Earth's Shape and Gravity, Pergamon Press
B.	Additional References
1	Blakely, R.J. 1994. Potential Theory in Gravity and Magnetic Applications, Cambridge University Press, Cambridge
2	Stacey, F. D and P.M. Davis. 2008. Physics of the Earth (4th Ed). Cambridge University Press, New York