



**INSTITUT TEKNOLOGI SEPULUH NOPEMBER
FACULTY OF CIVIL, PLANNING AND GEO ENGINEERING
DEPARTMENT OF GEOMATICS ENGINEERING
UNDERGRADUATE PROGRAM**

**Document
Code**

SEMESTER LEARNING PLAN (SLP)

COURSE NAME		CODE	COURSE GROUP	CREDITS (SKS)		SEMESTER	Date of Preparation
Geodynamics and Deformation		CM234963	Gedesy and Geodinamics	T=1	P=1	Elective Course	-
AUTHORIZATION		SLP Developer		Course Group Coordinator		Head of Study Program	
		Ira Mutiara Anjasmara, S.T., M.Phil., Ph.D.		Prof. Dr. Eko Yuli Handoko, S.T., M.T.		Putra Maulida, S.T., M.T., Ph.D.	
Learning Outcomes (LO)	Expected Learning Outcomes (ELO) that Imposed in the Course						
	ELO-5	Able to design survey and mapping activities using the latest technology in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.					
	ELO-6	Able to identify, formulate, analyze and solve problems in the fields of Geodesy and Surveying, Hydrography, Photogrammetry and Remote Sensing, as well as Geospatial and Land Information.					
	ELO-7	Able to perform spatial data acquisition using modern measurement methods, geospatial data processing, using industry standard software, and making standard designs and analyses in the fields of Geodesy and Surveying, Hydrography, Photogrammetry and Remote Sensing, as well as Geospatial and Land Information.					
	Course Learning Outcomes (CLO)						
	CLO-1	Able to explain the relationship between the structure of the Earth and the theory of plate tectonics with geodynamic phenomena and deformations					
	CLO-2	Able to identify/show types of geodynamic phenomena and deformations					
	CLO-3	Able to explain geodetic aspects in the study of geodynamics and deformation					
	CLO-4	Able to identify/demonstrate appropriate geodetic methods for observing and analyzing geodynamic phenomena and deformations					
	CLO-5	Able to apply geodetic methods in geodynamic and deformation studies and analyze the results					
			Matrix ELO – CLO				

		CPMK	ELO-2	ELO-6	ELO-7	
		CLO-1	V			
		CLO-2		V		
		CLO-3		V	V	
		CLO-4			V	
		CLO-5			V	
Course Description	In this lecture, the science and concepts of geodynamics related to the structure and dynamics of the earth are studied such as volcanic phenomena, plate movements (landslides and earthquakes). Students can also understand deformation studies such as landsubsidence phenomena, geodesy aspects in deformation studies and knowledge of geodesy science applications and methods in deformation surveys. After studying geodynamics and deformation studies, it is expected to open students' insights into disaster mitigation knowledge					
Course Materials	1. Introduction to Geodynamics and Deformation 2. Earth's structures: layers of the Earth, Earth's core, Earth's characteristics 3. Plate Tectonics: plate tectonics theories, continental drift, and geological studies 4. Geodynamics phenomena: volcano, earthquake, fault activities, landslide, land subsidence 5. Methods of geodynamics survey: geodynamics studies using SLR, VLBI, GNSS, and InSAR 6. Geodynamics studies : global and regional crustal deformation 7. Deformation studies : geodetic aspects in deformation study, deformation analysis methods, deformation surveys, deformation survey networks, case studies 8. Disaster mitigation					
References	Main:					
	1. Turcotte, D. L and G. Schubert. 2002. Geodynamics (2nd Ed). Cambridge University Press, Cambridge. 2. Caspary, W.F. 1998. Concepts of Network and Deformation Analysis. Monograph 11, School of Surveying. The University of New South Wales. 3. Smith, D. E and D.L. Turcotte. 2013. Contribution of Space Geodesy to Geodynamics. Published by the American Geophysical. 4. Segall, Paul. 2010. Earthquake and Volcano Deformation. Princenton University Press. Pricenton. New Jersey 5. Mal, A.K. and S.J. Singh. 1991. Deformation of Elastic Solids. Prentince Hall, Inc., New Jersey					
	Additional :					
	-					
	Lecturer	Ira Mutiara Anjasmara, S.T., M.Phil., Ph.D.				
Prerequisite	-					

Class/ Week	Lesson Learning Outcome (Sub-CLO)	Evaluation		Forms of Learning, Learning methods, Student Assignments/Task, [Estimated Time]		Learning Materials [References]	Weight (%)
		Indicators	Criteria and Form	Offline	Online		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Able to study of geodynamics and deformation	Accuracy in studying of geodynamics and deformation	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45']		Introduction to the study of geodynamics and deformation	5
2	Able to explain the earth Structure	Accuracy in explaining the earth Structure	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45']		Earth Structure; Theory of Plate Tectonics; Earth shape and topography; Plate tectonic order	5
3	Able to explain the Geodynamic phenomena and deformations	Accuracy in explaining the Geodynamic phenomena and deformations	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1x 45'] 2. Task [1 x 45']		Geodynamic phenomena and deformations: Earthquake cycle; Volcano; Plate Deformation; Active fault; Land subsidence; etc	10
4	Able to explain the Geodetic monitoring of deformation and geodynamics	Accuracy in explaining the Geodetic monitoring of deformation and geodynamics	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion, Task [1 x 45']		Geodetic monitoring of deformation and geodynamics, comparison of geodetic methods and other methods, accuracy and accuracy of geodetic methods,	10

						position, velocity and displacement, strain and stress	
5 – 6	Able to explain the geodetic techniques for geodynamic monitoring and deformation	Accuracy in explaining the geodetic techniques for geodynamic monitoring and deformation	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion, Task [2 x 45']		Geodetic techniques for geodynamic monitoring and deformation: GNSS: GNSS Data Processing; Concepts GNSS ; InSAR: InSAR concept, InSAR data processing; Earthquake source modeling with elastic half-space model; Modeling of fault deformation sources with screw-dislocation models	10
7	Able to explain the case study material	Accuracy in explaining the case study material	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Discussion [1 x 45'] 2. Task [1 x 45']		Material in accordance with the selected case study and project	10
8	Midterm Evaluation / Midterm Exam						50
9 – 15	Able to explain the Sea Levels Variation	Accuracy in explaining the Sea Levels Variation	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1x 45'x 7] 2. Discussion Project [1x45'x 7]		Material in accordance with the selected case study and project	50
16	Final Semester Evaluation / Final Semester Examination						100