	SEMESTER LEARNING PLAN **DEPARTMENT OF GEOMATICS ENGINEERING** **FACULTY OF CIVIL, PLANNING, and GEO ENGINEERING**			
PROGRAM	**UNDERGRADUATE**			
COURSE NAME	**Satellite Geodesy**		**CODE**	**RM184411**
SEMESTER	**IV (four)**		**CREDITS**	**3 (three)**
LECTURERS	**Mokhamad Nur Cahyadi, ST, MSc, PhD**			
	Dr Eko Yuli Handoko, ST, MT			
COURSE MATERIALS	1	The concept of cartesian and polar coordinate systems 2D and 3D.		
	2	The concept of reference frame.		
	3	The concept of time systems and orbit systems.		
	4	The concept of signal and signal propagation.		
	5	The concept of a signal propagation medium (atmospheric layer).		
	6	Concept of Satellite Types and their applications such as VLBI, SLR, LLR, GRACE, GOCE, Altimetry and others.		
EXPECTED LEARNING OUTCOMES THAT IMPOSED IN THE COURSE	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.		
	F	Able to compile scientific reports and provide solutions based on leadership, creativity and communication skills as well as being responsible for the work done.		
	H	Able to work in inter-disciplinary and inter-cultural teams so they can compete at national and international levels.		
COURSE LEARNING OUTCOMES	1	Able to understand the concept of time systems.		
	2	Able to understand the 2D and 3D coordinate systems.		
	3	Able to understand both the celestial reference frame and the terrestrial reference frame.		
	4	Able to explain the concept of signal and signal propagation methods.		
	5	Able to explain the atmosphere and its role in satellite geodesy.		
	6	Able to explain about how VLBI, SLR, LLR, Altimetry, GNSS satellites work in data acquisition.		
ABILITY CATEGORIES	*Cognitive Prosecess*	*Analyse*		
	Knowledge Domain	*Procedural*		
	Psychomotor	*Conscious control*		
	Affective	*Change of attitude*		

Class	Lesson learning outcome	Criteria dan Assessment Indicator	Weight	Learning Materials	Learning Experience	Learning Methods	Estimated Time
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Able to explain the time system	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5%	1.1 Explanation of Syllabus, Course Standings, 1.2 definitions and concepts of satellite geodesy 1.3 Definition and concept of time	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 50' 2 x 60'
2-3	Able to know various kinds of time systems	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	2.1 The Concept of Sidereal Time 2.2 Universal Time 2.3 Sidereal Time	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning	2 x 50' 2 x 50' 2 x 60'
4	Able to understand the coordinate reference frame	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	3.1 CIS coordinate reference framework 3.2 CTS coordinate reference framework 3.3 Transformation between CIS to CTS	Lectures Discussion Exercise	Teacher-centered learning Student-centered	2 x 50' 2 x 50'

4-5	Able to understand the concept of signals, signal propagation and bias	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	20%	4.1 The concept of wave propagation 4.2 Ionosphere bias 4.3 Tropospheric bias 4.4 Effects of atmospheric bias on signal propagation	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based	2 x 50' 2 x 50' 2 x 60'
6-7	Able to understand the concept of the orbit system	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	6.1 Components of the keplerian element 6.2 Perturbation on the keplerian element 6.3 Effects of orbital errors in data acquisition	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 50' 2 x 60'
8	Mid semester evaluation						
9-10	Able to explain the concepts and methods of data acquisition on VLBI, and GNSS	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	9.1 Field orientation 9.2 Count the number of points and proportional to area 9.3 Calculating costs 9.4 Place and select points 9.5 Personnel mobility	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 50' 2 x 60'
11-12	Able to explain the concepts and methods of data acquisition on LLR and SLR satellites	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	11.1 Processing using scientific software 11.2 Processing using commercial software	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based	2 x 50' 2 x 50' 2 x 60'
13-14	Able to explain the concepts and methods of data acquisition on Satellite Altimetry and GOCE	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	20%	13.1 Measurement using the radial method 13.2 Measurement using the net method	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based	2 x 50' 2 x 50' 2 x 60'
15	Able to explain the concepts and methods of data acquisition on the GRACE Satellite	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5%	15.1 Measurement of GNSS on RTRW 15.2 Measurement of GNSS on land parcels	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based	2 x 50' 2 x 50' 2 x 60'
16	Final semester evaluation						
						TOTAL	100%