	SEMESTER LEARNING PLAN **DEPARTMENT OF GEOMATICS ENGINEERING** **FACULTY OF CIVIL, PLANNING, and GEO ENGINEERING**		
PROGRAM	**UNDERGRADUATE**		
COURSE NAME	**Advanced Terrestrial Mapping**	**CODE**	**RM184307**
SEMESTER	**III (three)**	**CREDITS**	**4 (four)**
LECTURERS	**Mokhamad Nur Cahyadi [Coord]** **M. Rohmaneo Darminto, Akbar Kurniawan, Khomsin, Yanto Budisusanto, Husnul Hidayat**		

COURSE MATERIALS	1	Topographic Mapping
	2	Mapping reference frame and applying it in measurements
	3	Resection
	4	Height system used
	5	Procedure and application of using total station
	6	Tachymetry method
	7	Procedure for plotting detail points
	8	Contour
	9	Area and volume calculation
EXPECTED LEARNING OUTCOMES THAT IMPOSED IN THE COURSE	B	Able to design survey and mapping activities using the latest technology 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.
	E	Able to apply information & communication technology and the latest technological developments in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, geographic information systems, 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.
COURSE LEARNING OUTCOMES	1	Able to understand about Topographic Mapping.
	2	Able to understand about the use of Mapping reference frame and apply it in real measurement.
	3	Able to calculate and measure the position using resection method.
	4	Able to measure and differentiate the height system being used.
	5	Able to operate the Total Station, Theodolit and Waterpass equipment.
	6	Able to understand and do measurement using the tachymeri method for mapping and getting to know the points in the field.
	7	Able to draw terrain contours.
	8	Able to calculate the area of land and also cut and fill
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)
(1,2)	Able to explain the concept of topographic mapping involving work sequences, data taken in the field, data processing, and data presentation.	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5%	1. Understanding the map 2. Topographic map 3. The steps of the work of making topographic maps 4. The application of topographic maps for engineering fields [1]; [2]	Lectures Discussion Exercise	Teacher-centered Student-centered Problem-based learning	1 x 50' 1 x 50' 1 x 50'
(3)	Able to explain the use of mapping reference frame, reference frame types and the physical form of the reference frame in the field.	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5%	1. Horizontal Mapping reference frame 2. Vertical Mapping reference frame 3. Marking a frame realtization in the field 4. Bench Mark (BM) 5. Setting the location of the referemce	Lectures Discussion Exercise	Teacher-centered Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'

				[2]; [5]			
(4,5)	Able to explain how to determine the position of the point on a flat plane by uisng resection	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5%	1. The backward theory of the Collins and Cassini method 2. The direction of the angle of direction between two known coordinate points 3. Calculating the distance between two coordinate points 4. The coordinates of the assist point coordinates 5. Calculating the coordinates of the point sought. [2]	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'
(6,7)	Able to explain the use of height systems that exist in mapping in the flat plane and know the principle of levelling in wide space.	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	1. Theory of orthometric height and dynamic systems 2. Determination of the height of the Waterpass, Trigonomertris, Tachymetris, and Barometric ways 3. The calculation of levelling in wide space [2]; [5]	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'
8	Mid semester exam						
(9)	Able to operate the Total Station and explain the procedure for using the equipment and its function[9].	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	20%	1. Knowledge of total station equipment 2. Equipment parts and their functions 3. Errors that appear on the equipment. [4]	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'
(10,11)	Able to explain the method of tachymetry and the use of its formula for surveying of detail points	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	25%	1. Distance measurement of tachymetry methods 2. Measurement of height differences by tachymetry method 3. Retrieval of data collected by the tachymetry method 4. Formula explaination for distance and height difference [2]; [3]; [6]	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'
(12,13)	Able to explain the procedure for plotting points of field detail for map formation and contour creation	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	15%	1. Detail points taken for mapping purposes in the form of buildings, roads, channels, boundaries, electricity poles, telephone poles, trees and others 2. Retrieval based on user requirements 3. Paying attention to the scale of the map that is planned to be made [1]; [2]	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'
(14,15)	Able to explain the procedure of calculating the area of a mapping area and the volume of plans for an excavation or pile.	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10%	1. The area calculation on a flat plane with several methods: graphic, numerical, and mechanical 2. Volume count by several methods: average cross section, contour, and borrow pit [2]	Lectures Discussion Exercise	Teacher-centered learning Student-centered learning Problem-based learning	1 x 50' 1 x 50' 1 x 50'
16	Final semester exam						
						TOTAL	100%