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

SEMESTER LEARNING PLAN (SLP)

COURSE NAME	CODE	COURSE GROUP	CREDITS		SEMESTER	COMPILATION DATE
Advanced Terrestrial Mapping	CM234207	Surveying and Cadastral	T=2	P=1	3	-

AUTHORIZATION	SLP DEVELOPER	COURSE GROUP COORDINATOR	HEAD OF UNDERGRADUATE PROGRAM
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Learning Outcome (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, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.
	ELO-7	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.
	Course Learning Outcomes (CLO)	
	CLO-1	Students know about Topographic Mapping
	CLO-2	Students understand the use of the Mapping Framework and apply it in measurement

<table>
<tr><td></td><td>CLO-3</td><td>Students calculate and measure backward binding</td></tr>
<tr><td></td><td>CLO-4</td><td>Students are able to measure and distinguish the height system used.</td></tr>
<tr><td></td><td>CLO-5</td><td>Students are able to operate Total Station, Theodolite and Waterpass</td></tr>
<tr><td></td><td>CLO-6</td><td>Students are able to understand and measure the tachymeri method for mapping and recognizing detailed field points</td></tr>
<tr><td></td><td>CLO-7</td><td>Students can draw field contours</td></tr>
<tr><td></td><td>CLO-8</td><td>Students can calculate the area of ??land and excavations and embankments</td></tr>
<tr><td></td><td></td><td>Matrix ELO – CLO
<table>
<tr><td>CLO</td><td>ELO-5</td><td>ELO-6</td><td>ELO-7</td></tr>
<tr><td>CLO-1</td><td>V</td><td></td><td></td></tr>
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<tr><td>CLO-8</td><td></td><td>V</td><td>V</td></tr>
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<tr><td>Course Description</td><td colspan="2">This course explains about topographic mapping. Besides that, it is necessary to explain related to the calculation of area and volume with various methods. Next explained the measurement by the tachimetry method, including the ability to measure using oll meters, measuring signs, theodolite and spirit level, total station. This tachimetry method was applied to determine horizontal and vertical positions: the back point binding method, and the Polygon method.</td></tr>
<tr><td>Course Materials</td><td colspan="2">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</td></tr>
</table>

References	**Main References :**	
	1. Edward M. Mikhail dan Gordon Gracie. Analysis and Adjustment of Survey Measurement. Van Nostrand Reinhold Company. New York 2. James M. Anderson dan Edward M. Mikhail. Surveying. Theory and Practice. Mc Graw Hill. New York 3. Kissam Philip. 1981. Surveying for Cvil Engieering. USA 4. Modul ajar Ilmu Ukur Tanah II	
	Additional References :	
	1. Paul R. Wolf dan Charles D. Ghilani. Elementary Surveying. An Introduction to Geomatics. Pearson Education International 2. Paul R. Wolf dan Charles D. Ghilani. Elementary Surveying. An Introduction to Geomatics	
Lecturer	Ir. Yuwono, MS Akbar Kurniawan, ST, MT Husnul Hidayat, ST, MT Putra Maulida, ST, MT, Ph.D Prof. Mokhamad Nur Cahyadi, S.T., M.Sc., Ph.D. Dr. Muhammad Aldila Syariz, S.T., M.S., Ph.D.	
Prerequisite	Basic terrestrial mapping	

Class/ Week	**Lesson Learning Outcome (Sub-CLO)**	**Evaluation**		**Forms of Learning, Learning methods, Student Assignments/Task, [Estimated time]**		**Learning Materials [References]**	**Weight (%)**
		Indicator	**Criteria**	**Offline**	**Online**		
(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	Lectures, Teacher-centered [1x45’] Discussions, Student-centered [1x45’] Exercise, Problem-based learning [1x45’]		1. Understanding the map 2. Topographic map 3. The steps of the work of making topographic maps	5%

						4. The application of topographic maps for engineering fields [1]; [2]	
(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	Lectures. Teacher-centered [1x45'] Discussion, Student-centered learning [1x45'] Exercise, Problem-based learning [1x45']		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 frame point [2]; [5]	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	Lectures. Teacher-centered [1x45'] Discussion, Student-centered learning [1x45'] Exercise, Problem-based learning [1x45']		"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%

						5. Calculating the coordinates of the point sought. [2]	
(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	Lectures. Teacher-centered [1x45'] Discussion, Student-centered learning [1x45'] Exercise, Problem-based learning [1x45']		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]	10%
8	**Mid semester exam**						**50%**
(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	Lectures. Teacher-centered [1x45'] Discussion, Student-centered learning [1x45'] Exercise, Problem-based learning [1x45']		1. Knowledge of total station equipment 2. Equipment parts and their functions 3. Errors that appear on the equipment. [4]	20%
(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	Lectures. Teacher-centered [1x45'] Discussion, Student-centered learning [1x45']		1. Distance measurement of tachymetry methods	25%

				Exercise, Problem-based learning [1x45']		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]	
(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	Lectures. Teacher-centered [1x45'] Discussion, Student-centered learning [1x45'] Exercise, Problem-based learning [1x45']		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]	15%
(14,15)	Able to explain the procedure of calculating the area of a mapping area		Material completeness, depth of explanation, effectiveness of	Lectures. Teacher-centered [1x45']		1. The area calculation on a flat plane with several methods:	10%

	and the volume of plans for an excavation or pile.		communication, accuracy of attitude	Discussion, Student-centered learning [1x45'] Exercise, Problem-based learning [1x45']		graphic, numerical, and mechanical 2. Volume count by several methods: average cross section, contour, and borrow pit [2]	
16	**Final Semester Evaluation / Final Semester Examination**						**100%**