

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

		SEMES	TER LEARNIN	IG PLAN (SLP)				
COURSE NAME			COURSE GR	OUP	CREDITS		SEMESTER	COMPILATION
								DATE
Advanced Terrestrial Mapping			Surveying a	Surveying and Cadastral		P=1	3	-
AUTHORIZATION		SLP DEVELOPER COURSE GROU		COURSE GROUP COO	COURSE GROUP COORDINATOR		HEAD OF UNDERGRADUATE PROGRAM	
		Yanto Budisusanto, ST, M.Eng Dr. Filsa Bioresita, ST, N		MT Pu		Putra Maulid	Putra Maulida, ST, MT, Ph.D	
Expected Lo	earning Outo	comes (ELO) that Impo	sed 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.						ng, hydrographic,	
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 o	designs and analyze	es in the fields of geode	sy, surveying	g, hydrogr	raphy, remote sensing,	
	photogrammetry, and cadastral.							
Course Lea	rning Outcor	mes (CLO)						
CLO-1	Students	know about Topograp	ohic Mapping					
CLO-2	Students	understand the use of	f the Mapping Frai	nework and apply it ir	n measurem	ent		
	Expected Local Course ELO-5 ELO-6 ELO-7 Course Lea CLO-1	Expected Learning Outcome ELO-5 Able to deremote see ELO-6 Able to ide photogram ELO-7 Able to persoftware, photogram Course Learning Outcome CLO-1 Students	CODE Apping CM234207 SLP DEVELOPER Yanto Budisusanto, S Expected Learning Outcomes (ELO) that Important Course ELO-5 Able to design survey and mangemote sensing, photogrammer ELO-6 Able to identify, formulate, analog photogrammetry, and cadastral. ELO-7 Able to perform spatial data acque software, and making standard of photogrammetry, and cadastral. Course Learning Outcomes (CLO) CLO-1 Students know about Topogram	CODE COURSE GR Course Expected Learning Outcomes (ELO) that Imposed in the Course ELO-5 Able to design survey and mapping activities us remote sensing, photogrammetry, and cadastral. ELO-6 Able to identify, formulate, analyze and solve proble photogrammetry, and cadastral. ELO-7 Able to perform spatial data acquisition using mode software, and making standard designs and analyze photogrammetry, and cadastral. Course Learning Outcomes (CLO) CLO-1 Students know about Topographic Mapping	Apping CM234207 Surveying and Cadastral SLP DEVELOPER COURSE GROUP COO Yanto Budisusanto, ST, M.Eng Dr. Filsa Bioresita, ST, Expected Learning Outcomes (ELO) that Imposed in the Course ELO-5 Able to design survey and mapping activities using the latest techno remote sensing, photogrammetry, and cadastral. ELO-6 Able to identify, formulate, analyze and solve problems in the fields of geophotogrammetry, and cadastral. ELO-7 Able to perform spatial data acquisition using modern measurement methors software, and making standard designs and analyzes in the fields of geode photogrammetry, and cadastral. Course Learning Outcomes (CLO) CLO-1 Students know about Topographic Mapping	CODE COURSE GROUP CREDITS Apping CM234207 Surveying and Cadastral T=2 SLP DEVELOPER COURSE GROUP COORDINATOR Yanto Budisusanto, ST, M.Eng Dr. Filsa Bioresita, ST, MT Expected Learning Outcomes (ELO) that Imposed in the Course ELO-5 Able to design survey and mapping activities using the latest technology in the remote sensing, photogrammetry, and cadastral. ELO-6 Able to identify, formulate, analyze and solve problems in the fields of geodesy, survey photogrammetry, and cadastral. ELO-7 Able to perform spatial data acquisition using modern measurement methods, geospar software, and making standard designs and analyzes in the fields of geodesy, surveying photogrammetry, and cadastral. Course Learning Outcomes (CLO) CLO-1 Students know about Topographic Mapping	CODE COURSE GROUP CREDITS Mapping CM234207 Surveying and Cadastral T=2 P=1 COURSE GROUP COORDINATOR Yanto Budisusanto, ST, M.Eng Dr. Filsa Bioresita, ST, MT 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 remote sensing, photogrammetry, and cadastral. ELO-6 Able to identify, formulate, analyze and solve problems in the fields of geodesy, surveying, hydrophotogrammetry, and cadastral. ELO-7 Able to perform spatial data acquisition using modern measurement methods, geospatial data poftware, and making standard designs and analyzes in the fields of geodesy, surveying, hydrogrammetry, and cadastral. Course Learning Outcomes (CLO) CLO-1 Students know about Topographic Mapping	CODE COURSE GROUP CREDITS SEMESTER Apping CM234207 Surveying and Cadastral T=2 P=1 3 SLP DEVELOPER COURSE GROUP COORDINATOR Yanto Budisusanto, ST, M.Eng Dr. Filsa Bioresita, ST, MT Putra Maulid 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 remote sensing, photogrammetry, and cadastral. ELO-6 Able to identify, formulate, analyze and solve problems in the fields of geodesy, surveying, hydrographic, remote sphotogrammetry, and cadastral. ELO-7 Able to perform spatial data acquisition using modern measurement methods, geospatial data processing, using its software, and making standard designs and analyzes in the fields of geodesy, surveying, hydrography, remote sen photogrammetry, and cadastral. Course Learning Outcomes (CLO) CLO-1 Students know about Topographic Mapping

CLO-3	Students calculate and m	neasure backwa	rd binding						
CLO-4	Students are able to mea	sure and disting	guish the height s	ystem used.					
CLO-5	Students are able to ope	rate Total Statio	n, Theodolite and	l Waterpass					
CLO-6	Students are able to und	nts are able to understand and measure the tachymeri method for mapping and recognizing detailed field points							
CLO-7	Students can draw field	lents can draw field contours							
CLO-8	Students can calculate th	dents can calculate the area of ??land and excavations and embankments							
	Matrix ELO – CLO								
	CLO	ELO-5	ELO-6	ELO-7					
	CLO-1	V							
	CLO-2		V						
	CLO-3		V						
	CLO-4			V					
	CLO-5	V	V	V					
	CLO-6	V		V					
	CLO-7		V	V					
	CLO-8		V	V					
This course e	explains about topographic	mapping. Beside	es that, it is necess	ary to explain re	lated to the calculation of area and volume with				
		•	•	· · · · · · · · · · · · · · · · · · ·					
	•	•	method was appl	ied to determine	horizontal and vertical positions: the back point				
		od.							
		_							
		plying it in mea	surements						
_	=	na total atation							
		ng total station							
		nte							
		1113							
	CLO-4 CLO-5 CLO-6 CLO-7 CLO-8 This course of various meth theodolite and binding meth 1. Topogr 2. Mappir 3. Resecti 4. Height 5. Proced 6. Tachyn 7. Proced 8. Contour	CLO-5 Students are able to ope CLO-6 Students are able to und CLO-7 Students can draw field of CLO-8 Students can calculate the Matrix ELO - CLO CLO CLO-1 CLO-2 CLO-3 CLO-4 CLO-5 CLO-6 CLO-7 CLO-8 This course explains about topographic various methods. Next explained the methodolite and spirit level, total station binding method, and the Polygon methods. Next explained the methodolite and spirit level, total station binding method, and the Polygon methods. Resection 4. Height system used 5. Procedure and application of using total points. Tachymetry method 7. Procedure for plotting detail points.	CLO-4 Students are able to measure and disting CLO-5 Students are able to operate Total Station CLO-6 Students are able to understand and me CLO-7 Students can draw field contours CLO-8 Students can calculate the area of ??land Matrix ELO – CLO CLO ELO-5 CLO-1 V CLO-2 CLO-3 CLO-4 CLO-5 V CLO-6 CLO-7 CLO-8 This course explains about topographic mapping. Beside various methods. Next explained the measurement by the theodolite and spirit level, total station. This tachimetry binding method, and the Polygon method. 1. Topographic Mapping 2. Mapping reference frame and applying it in mea 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	CLO-4 Students are able to measure and distinguish the height station. CLO-5 Students are able to operate Total Station, Theodolite and CLO-6 Students are able to understand and measure the tachym CLO-7 Students can draw field contours CLO-8 Students can calculate the area of ??land and excavations Matrix ELO - CLO CLO ELO-5 ELO-6 CLO-1 V CLO-2 V CLO-3 V CLO-4 CLO-5 V V CLO-6 CLO-6 CLO-7 V CLO-8 V This course explains about topographic mapping. Besides that, it is necess various methods. Next explained the measurement by the tachimetry methodolite and spirit level, total station. This tachimetry method was appl binding method, and the Polygon method. 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	CLO-4 Students are able to measure and distinguish the height system used. CLO-5 Students are able to operate Total Station, Theodolite and Waterpass CLO-6 Students are able to understand and measure the tachymeri method for r CLO-7 Students can draw field contours CLO-8 Students can calculate the area of ??land and excavations and embankme Matrix ELO - CLO CLO ELO-5 ELO-6 ELO-7 CLO-1 V				

Refere	nces	Main Refer	ences :						
		1. Edwar	d M. Mikhail dan	Gordon Gracie. Analysis ar	nd Adjustment of Survey M	easurement. Van No	ostrand Reinhold Company.	New Yor	
				-	ying. Theory and Practice. I				
		3. Kissan	ı Philip. 1981. Su	rveying for Cvil Engieering	g. USA				
		4. Modul	ajar Ilmu Ukur T	'anah II					
		Additional F	References						
		:							
		1. Paul R	. Wolf dan Charle	es D. Ghilani. Elementary Su	urveying. An Introduction to	o Geomatics. Pearso	on Education International		
		2. Paul R	. Wolf dan Charle	es D. Ghilani. Elementary Su	urveying. An Introduction to	o Geomatics			
Lecture	r	Ir. Yuwono,	MS						
		Akbar Kurn	iawan, ST, MT						
		Husnul Hid	ayat, ST, MT						
			ida, ST, MT, Ph.D	ahyadi, S.T., M.Sc., Ph.D.					
			•						
			mad Aldila Syariz	z, S.T., M.S., Ph.D.					
Prereq	uisite	Basic terres	trial mapping						
Class/ Week	Lesson Learnir (Sub-C	_		Evaluation	Forms of Lo Learning m Student Assign [Estimate	nethods, ments/Task,	Learning Materials [References]	Weigh	
			Indicator	Criteria	Offline	Online			
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	
	Able to evals	n the		Material completeness,	Lectures, Teacher-		1. Understanding the	5%	
(1,2)	Able to explai			–	1			1	
(1,2)	concept of to			depth of explanation,	centered [1x45']		map		
(1,2)	·	pographic		depth of explanation, effectiveness of	Discussions, Student-		map 2. Topographic map		
(1,2)	concept of to	pographic Iving work			Discussions, Student- centered [1x45']		<u> </u>		
(1,2)	concept of to mapping invo	pographic Iving work ata taken in		effectiveness of	Discussions, Student-		2. Topographic map		

					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.	dep effe con	terial completeness, pth of explanation, fectiveness of mmunication, curacy 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 reference 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	dep effe con	terial completeness, pth of explanation, fectiveness of mmunication, curacy 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 complete depth of expless communication accuracy of a	anation, centered [1x45'] of Discussion, Student- centered learning	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 complete depth of explements of a material complete depth of explements of accuracy of a	centered [1x45'] Discussion, Student- centered learning	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 complete depth of explements of accuracy of a	lanation, centered [1x45'] of Discussion, Student- centered learning	1. Distance measurement of tachymetry methods	25%

			Exercise, Problembased 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]
(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:

	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					