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
Engineering Survey	CM234313	Surveying and Cadastral	T=2	P=1	4	-

AUTHORIZATION	SLP DEVELOPER	COURSE GROUP COORDINATOR	HEAD OF UNDERGRADUATE PROGRAM
	Dr. Filsa Bioresita, S.T., M.T.	Yanto Budisusanto, ST, M.Eng	Putra Maulida, ST, MT, Ph.D

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-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.
	ELO-8	Able to compile scientific reports and provide solutions based on leadership, creativity and communication skills as well as being responsible for the work done.
	ELO-9	Able to plan, perform and evaluate the process of surveying and mapping activities using the latest technology in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.
	Course Learning Outcomes (CLO)	
	CLO-1	Able to use basics mathematics formula , geometry, and trigonometry

<table>
<tr><td></td><td>CLO-2</td><td>Able to measure the height and slope of buildings</td></tr>
<tr><td></td><td>CLO-3</td><td>Able to stake out horizontal and vertical for simple curvature</td></tr>
<tr><td></td><td>CLO-4</td><td>Able to measure and peg (uit zet) for buildings.</td></tr>
<tr><td></td><td></td><td>Matrix ELO – CLO
<table>
<tr><td>CLO</td><td>ELO-5</td><td>ELO-7</td><td>ELO-8</td><td>ELO-9</td></tr>
<tr><td>CLO-1</td><td>V</td><td></td><td></td><td></td></tr>
<tr><td>CLO-2</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
<tr><td>CLO-3</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
<tr><td>CLO-4</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
</table></td></tr>
<tr><td>Course Description</td><td colspan="2">In this lecture will be given the basics of mathematics that cover the geometry and trigonometry in the field of geomatics for applications in the field of civil engineering (buildings and infrastructure, road geometry, elevation planning and planimetric positions, cut and fill). The role of geomatics in engineering and methods to support applications in civil engineering. To further strengthen student skills, practical materials will be provided in the field in accordance with the subject matter and application in the field of civil engineering</td></tr>
<tr><td>Course Materials</td><td colspan="2">1. Fundamentals of mathematics Geometry and trigonometry.
2. Building height measurement application.
3. Road geometry.
4. Horizontal and vertical alignment.
5. Horizontal and Vertical Staking Out Alignments.
6. Staking out of buildings and lots.
7. Measurement and calculation of the volume of cut and fill.</td></tr>
<tr><td rowspan="3">References</td><td colspan="2">Main References :</td></tr>
<tr><td colspan="2">1. Hendriatiningsih. Geometris Jalan Raya & Staking Out ITB. Bandung 1979
2. Paul R. Wolf dan Charles D. Ghilani. Elementary Surveying. An Introduction to Geomatics
3. Hickerson. Route Location And Design. Mc Graw-Hill Book
Additional References :</td></tr>
<tr><td colspan="2">1. Tumewu Liem, Engineering Survey . ITB. Bandung . 1977
2. Modul ajar Ilmu Ukur Tanah II</td></tr>
<tr><td>Lecturer</td><td colspan="2">Prof. Mokhamad Nurcahyadi, ST, M.Sc, Ph.D</td></tr>
</table>

	Dr. Filsa Bioresita, ST, MT Yanto Budisusanto, ST, M.Eng Dr. Muhammad Aldila Syariz, S.T., M.S., Ph.D.						
Prerequisite	Advanced terristrial 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 concepts of calculus basics for engineering surveys		Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	Lectures, Teacher-centered learning [2 x 45’]		The postulates in triangles, the principle of sine comparison, the cosine formula, tangent, and the inverse	10%
				Discussion, Student-centered learning [2 x 45’]		The principle of line alignment, angular angles, obtuse angles, and taper	
				Exercise, Problem-based learning [2 x 45’]			
				Assignment, [ ]			
3	Able to explain highway geometry in general		Material completeness, depth of explanation,	Lectures, Teacher-centered learning [1 x 45’]		Straight ronad, bend, superelevate, road surface height	5%

			effectiveness of communication, accuracy of attitude	Discussion, Student-centered learning [1 x 45’]			
				Exercise, Problem-based learning [1 x 45’]			
				Assignment, []			
4	Able to explain the basic concepts of horizontal alignment, the main parts of the horizontal curve.		Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	Lectures, Teacher-centered learning [1 x 45’]		The central point of the curve (O),	10%
				Discussion, Student-centered learning [1 x 45’]		Arch radius (R),	
				Exercise, Problem-based learning [1 x 45’]		The intersection of the hand, the tangent line, the starting point of the curve	
				Assignment, []		Arch end point.	
5 - 6	Able to explain Horizontal Staking Out Alignment in several method, the difference between the bow is the same length, the difference between the same length arc, etc.		Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	Lectures, Teacher-centered learning [2 x 45’]		Staking out: Bow difference equal	15%

				Discussion, Student-centered learning [2 x 45’]		Abscissa difference is the same length	
				Exercise, Problem-based learning [2 x 45’]		Polar	
				Assignment-1, []		Polygon	
						Bowstring extension	
7	Able to explain the concept of vertical alignment that has a starting and ending point, as well as symmetrical and asymmetrical types.		Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	Lectures, Teacher-centered learning [1 x 45’]		The slope meaning (g)	10%
				Discussion, Student-centered learning [1 x 45’]		Slope in percent	
				Exercise, Problem-based learning [1 x 45’]		Stationing	
				Assignment, []		Slope changes	
8	Mid Semester Evaluation						**50**
9 - 10 - 11	Able to explain vertical alignment staking out by showing the location of the turning point, the height of the		Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	Lectures, Teacher-centered learning [3 x 45’]		Understanding the length of the vertical bend	25%
				Discussion, Student-centered learning [3 x 45’]		Division in stationing	

	turning point (extreme).			Exercise, Problem-based learning [3 x 45’]		Curved starting point	
				Assignment, []		Curved endpoint	
						Height along the curve according to the distance	
						Extreme point	
						Extreme location	
12 - 13	Able to apply the concept of coordinates to uitzet buildings		Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	Lectures, Teacher-centered learning [2 x 45’]		Understanding coordinates 2 dimention (x, y)	10%
				Discussion, Student-centered learning [2 x 45’]		Line alignment	
				Exercise, Problem-based learning [2 x 45’]		Line straightness	
				Assignment, []		Line straightforwardness	
						Comparison of triangle similarity	
14 - 15	Being able to apply the concept of coordinates toCalculating		Material completeness, depth of explanation, effectiveness of	Lectures, Teacher-centered learning [2 x 45’]		Understanding coordinates in 3 dimensional (x, y, z)	15%
						Area intersection	

	building height and building slope		communication, accuracy of attitude	Discussion, Student-centered learning [2 x 45’]		Space intersection	
				Exercise, Problem-based learning [2 x 45’]		Building height counts against references	
						The slope of the building	
				Assigment 2, []			
16	**Final Semester Evaluation / Final Semester Examination**						**100**