



**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				
Map Projection		CM234416	Geodesy and Geodynamics	T=2	P=0	4	-				
AUTHORIZATION		SLP DEVELOPER		COURSE GROUP COORDINATOR		HEAD OF UNDERGRADUATE PROGRAM					
		Putra Maulida, ST, MT, Ph.D		Prof. Dr. Eko Yuli Handoko, ST, MT		Putra Maulida, ST, MT, Ph.D					
Learning Outcome (LO)	Expected Learning Outcomes (ELO) that Imposed in the Course										
	ELO-2	Able to study and utilize science and technology in order to apply it to the areas of expertise in Geodesy and Surveying, Hydrography, Photogrammetry, and Remote Sensing, as well as Geospatial and Land Information, and able to make appropriate decisions from the results of their own work or group work in the form of a final project report or other forms of learning activities whose outcomes are equivalent to the final project through logical, critical, systematic and innovative thinking.									
	ELO-4	Able to apply mathematics, science, and engineering in the fields of geodesy, surveying, hydrography, remote sensing, photogrammetry, geographic information systems, and cadastral to gain a thorough. understanding of the principles of engineering.									
	Course Learning Outcomes (CLO)										
	CLO-1	able to explain and differs coordinate system in geodesy/geomatics									
	CLO-2	able to explain concept of sphere geometry and ellipsoid, and do calculations in those surface									
	CLO-3	able to explain and differs kinds of map projection									

	CLO-4	able to do geodetic reduction (angle and distance) from ellipsoid to projected field																				
	CLO-5	able to do geodetic calculation on ellipsoid and projected field																				
		<b>Matrix ELO – CLO</b> <table><tr><td>CLO</td><td>ELO-2</td><td>ELO-4</td></tr><tr><td>CLO-1</td><td>V</td><td></td></tr><tr><td>CLO-2</td><td>V</td><td></td></tr><tr><td>CLO-3</td><td>V</td><td></td></tr><tr><td>CLO-4</td><td></td><td>V</td></tr><tr><td>CLO-5</td><td></td><td>V</td></tr></table>			CLO	ELO-2	ELO-4	CLO-1	V		CLO-2	V		CLO-3	V		CLO-4		V	CLO-5		V
CLO	ELO-2	ELO-4																				
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CLO-3	V																					
CLO-4		V																				
CLO-5		V																				
<b>Course Description</b>	The Map Projection course covers the fundamental concepts and applications of various coordinate systems used in geodesy and geomatics. Topics include understanding spherical and ellipsoidal geometry, geodetic reference systems (datums), and the concepts and types of map projections suitable for different mapping applications. Students will also learn geodetic calculations such as the reduction of angles and distances from the ellipsoidal surface to the projection plane, as well as two- and three-dimensional coordinate transformations, including datum and zone-to-zone transformations. The course incorporates practical exercises and assignments that emphasize mastery of concepts and systematic computational skills, supporting students in accurate mapping and geospatial data processing.																					
<b>Course Materials</b>	<div>1. Coordinate Systems</div> <div>2. Spherical and Ellipsoidal Geometry</div> <div>3. Geodetic Datum</div> <div>4. Map Projections</div> <div>5. Calculations on Projection Plane</div> <div>6. Calculations on Ellipsoidal Surface</div> <div>7. 2D Coordinate Transformation</div> <div>8. 3D Coordinate Transformation</div> <div>9. Datum Transformation</div> <div>10. Coordinate Transformation Between Projection Zones</div>																					
<b>References</b>	<b>Main References :</b>																					
	<b>Additional References</b> :																					

<b>Lecturer</b>		Ira Mutiara Anjasmara, ST, M.Phil, Ph.D Akbar Kurniawan, ST, MT Dr. Eko Yuli Handoko, ST, MT					
<b>Prerequisite</b>							
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	Able to explain and distinguish various coordinate systems used in geodesy/geomatics	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude	Test: Quiz	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		Coordinate Systems	5
2	Able to explain the concepts of spherical and ellipsoidal geometry, and perform calculations on spherical and ellipsoidal surfaces	Completeness of material, depth of explanation, accuracy of answers, communication	Test: Quiz Non-Test: Assignment 1	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		Spherical and Ellipsoidal Geometry	5

		effectiveness, accuracy of attitude					
<b>3</b>	Able to explain the concept of geodetic reference systems/datums	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude, clarity of presentation	Test: Quiz	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		Geodetic Datum	5
<b>4-5</b>	Able to explain the concept of map projection, distinguish various types of map projections, and determine the appropriate projection for specific applications	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude	Test: Quiz Non-Test: Assignment 2	Interactive lecture, discussion, reading references [TM: 2 x (2x50')] [BM: 2 x (2x60')] [PT: 2 x (2x60')]		Map Projections	25
<b>6</b>	Able to perform geodetic size reductions (angles and distances) from the ellipsoidal surface to projection/plane surface	Completeness of material, depth of explanation, accuracy of	Test: Quiz	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		Calculations on Projection Plane	5

		answers, communication effectiveness, accuracy of attitude					
<b>7</b>	Able to perform geodetic calculations on ellipsoidal and projection/plane surfaces	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude	Test: Quiz	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		Calculations on Ellipsoidal Surface	5
<b>8</b>	<b>Midterm Evaluation / Midterm Exam</b>						
<b>9</b>	Able to explain the basic concepts of coordinate transformation and distinguish various coordinate transformation methods	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude	Test: Quiz Non-Test: Assignment 3	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		2D Coordinate Transformation	10
<b>10-12</b>	Able to perform 2D and 3D coordinate transformations in geodesy/geomatics	Completeness of material, depth of	Test: Quiz	Interactive lecture, discussion, reading references		3D Coordinate Transformation	25

		explanation, accuracy of answers, communication effectiveness, accuracy of attitude		[TM: 3 x (2x50')] [BM: 3 x (2x60')] [PT: 3 x (2x60')]			
<b>13-14</b>	Able to explain the concept of datum transformation and perform datum transformation calculations	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude	Test: Quiz	Interactive lecture, discussion, reading references [TM: 2 x (2x50')] [BM: 2 x (2x60')] [PT: 2 x (2x60')]		Datum Transformation	10
<b>15</b>	Able to perform coordinate transformation between zones in certain projected coordinate systems	Completeness of material, depth of explanation, accuracy of answers, communication effectiveness, accuracy of attitude	Test: Quiz	Interactive lecture, discussion, reading references [TM: 1 x (2x50')] [BM: 1 x (2x60')] [PT: 1 x (2x60')]		Coordinate Transformation Between Projection Zones	5
<b>16</b>	<b>Final Semester Evaluation / Final Semester Examination</b>						