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

SEMESTER LEARNING PLAN (SLP)

COURSE NAME	CODE	COURSE GROUP	CREDITS (SKS)		SEMESTER	Date of Preparation
Astronomical Geodesy	CM234965	Geodesy and Geodinamics	T=1	P=1	Elective Course	-

AUTHORIZATION	SLP Developer	Course Group Coordinator	Head of Study Program
	Prof. Mokhamad Nur Cahyadi, S.T., M.Sc., Ph.D.	Prof. Dr. Eko Yuli Handoko, S.T., M.T.	Putra Maulida, S.T., M.T., Ph.D.

Learning Outcomes (LO)

Expected Learning Outcomes (ELO) that Imposed in the Course	
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.
ELO-6	Able to identify, formulate, analyze and solve problems in the fields of Geodesy and Surveying, Hydrography, Photogrammetry and Remote Sensing, as well as Geospatial and Land Information.
ELO-7	Able to perform spatial data acquisition using modern measurement methods, geospatial data processing, using industry standard software, and making standard designs and analyses in the fields of Geodesy and Surveying, Hydrography, Photogrammetry and Remote Sensing, as well as Geospatial and Land Information.
Course Learning Outcomes (CLO)	
CLO-1	Students are able to understand the definitions and concepts of geodetic astronomy
CLO-2	Students are able to understand and apply basic calculations in the field of football
CLO-3	Students are able to understand spherical coordinate systems and orbital systems
CLO-4	Students are able to understand and make observations of the sun to determine azimuth
CLO-5	Students are able to understand and carry out star observations for azimuth observations
CLO-6	Students are able to apply astronomical concepts in the field of mapping

Matrix ELO – CLO

CPMK	ELO-4	ELO-6	ELO-7
CLO-1	V		
CLO-2	V	V	
CLO-3	V	V	
CLO-4		V	V
CLO-5		V	V
CLO-6		V	V

Course Description	This course covers the fundamentals of geodetic astronomy, including its definition, principles, and applications in spherical and orbital coordinate systems. Students will study the concepts of solar azimuth and star azimuth as part of astronomical observations related to position measurements on the Earth's surface. Understanding these topics forms the foundation for astronomical positioning and geodetic reference systems.
Course Materials	1. Definition, principles of geodetic astronomy 2. Spherical Coordinate System and Orbital System 3. Concept of solar azimuth 4. Concept of star azimuth
References	**Main:**
	1. Torge, W., & Müller, J. (2012). Geodesy (4th Edition). De Gruyter. 2. Seeber, G. (2003). Satellite Geodesy: Foundations, Methods, and Applications (2nd Edition). Walter de Gruyter. 3. Hofmann-Wellenhof, B., & Moritz, H. (2005). Physical Geodesy. Springer.
	Additional :
	1. Vaníček, P., & Krakiwsky, E. J. (1986). Geodesy: The Concepts. North-Holland. 2. Grewal, M. S., Weill, L. R., & Andrews, A. P. (2007). Global Positioning Systems, Inertial Navigation, and Integration. Wiley-Interscience. 3.
Lecturer	1. Prof. Mokhamad Nur Cahyadi, S.T., M.Sc., Ph.D. 2. Putra Maulida, S.T., M.T., Ph.D
Prerequisite	-

Class/ Week	Lesson Learning Outcome (Sub-CLO)	Evaluation		Forms of Learning, Learning methods,Student Assignments/Task, [Estimated Time]		Learning Materials [References]	Weight (%)
		Indicators	Criteria and Form	Offline	Online		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1 – 2	Able to understand the definitions and concepts of geodetic astronomy	Accuracy in understanding the definitions and concepts of geodetic astronomy	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [2 x 45']		Definitions and concepts of geodetic astronomy	10
3 – 4	Able to understand and apply basic calculations in spherical	Accuracy in understanding and applying basic calculations in spherical	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [2 x 45']		Spherical basic calculations	10
5 – 6	Able to understand the spherical Coordinate System and Orbital System	Accuracy in understanding the spherical Coordinate System and Orbital System	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [2 x 45']		Spherical Coordinate System and Orbital System	10
7	Able to understand the concept of solar azimuth	Accuracy in understanding the concept of solar azimuth	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2x 45'] 2. Discussion [1 x 45']		Concept of solar azimuth	20
8	**Midterm Evaluation / Midterm Exam**						**50**
9 – 10	Able to carry out solar azimuth measurements	Accuracy in carrying out solar azimuth measurements	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [1 x 45'] 3. Task [1 x 45']		Solar azimuth measurements	10
11	Able to understand the concept of star azimuth	Accuracy in understanding	1. Completeness of the material	1. Lecture [1 x 45'] 2. Discussion [1 x 45']		Concept of star azimuth	10

		the concept of star azimuth	2. Depth of explanation and effectiveness of communication				
12 – 13	Able to carry out star azimuth measurements	Accuracy in carrying out star azimuth measurements	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [1 x 45'] 3. Task [1 x 45']		Star azimuth measurements	10
14 – 15	Able to explain the concept of geodetic astronomy used in mapping applications	Accuracy in explaining the concept of geodetic astronomy used in mapping applications	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion, Task [1 x 45'] 3. Task [1 x 45']		Mapping applications	20
16	**Final Semester Evaluation / Final Semester Examination**						**100**