	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
Tides and Water Level	CM234982	Geomarine	T=1	P=1	Elective Course	-

AUTHORIZATION	SLP Developer	Course Group Coordinator	Head of Study Program
	Danar Guruh Pratomo, S.T., M.T., Ph.D.	Dr. Muhammad Aldila Syariz, S.T., M.S., Ph.D.	Putra Maulida, S.T., M.T., Ph.D.

Learning Outcomes (LO)

Expected Learning Outcomes (ELO) that Imposed in the Course

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	Able to understand the definition, concept, theories, and applications of the ocean tide.
CLO-2	Able to explain tide observation methods.
CLO-3	Able to do harmonic analysis using Doodson, Admiralty, and Least Square methods
CLO-4	Able to describe tide characteristics.
CLO-5	Able to describe vertical references.
CLO-6	Able to do tide modeling and predictions.

Matrix ELO – CLO

CPMK	ELO-6	ELO-7
CLO-1	V	

CLO-2	V	
CLO-3	V	V
CLO-4	V	
CLO-5	V	
CLO-6	V	V

Course Description	This lecture will study the definitions, concepts and theories about tides and methods for measuring tides. Tides are very useful for the fields of Geomatics and Non Geomatics. One of the tidal products used in the field of Geomatics is vertical references such as highest astronomical tides (HAT, mean sea level (MSL), lowest astronomical tides (LAT) and other references that are often used for topographic and hydrographic mapping, while tidal applications seawater outside the nonGeomatics field is for navigation, recreation, energy generation and etc. The method used to solve the tidal component is admiralty and least square.This lecture will also study tidal predictions in the future with harmonic equations.
Course Materials	1. Tidal definitions, concepts, theories and applications 2. Tidal measurement method Doodson 3. Admiralty and Least Square methods 4. Tidal characteristics 5. Tidal predictions
References	**Main:**
	1. NOAA., 2000. Tidal Datums And Their Applications. Maryland. US. Department of Commerce 2. Hicks, S.D., 2006. Understanding Tides. NOAA: Center for Operational Oceanographic Products and Services
	Additional :
	1. NOAA, 2005. National Ocean Service Education: Tides and Water Levels. https://oceanservice.noaa.gov/education/tutorial_tides/welcome.html 2. Ray, R.D., Egbert, G.D, Erofeevaa, S.Y., 2005. Brief of overview Tides in the Indonesian Seas. Oceanography Vol. 18, No. 4, Dec. 2005
Lecturer	Danar Guruh Pratomo, S.T., M.T., Ph.D.
Prerequisite	Hidrographic Survey

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 concepts and theories of tides	Accuracy in understanding the concepts and theories of tides	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [2 x 45']		Tidal theory; The tidal generator force	5
3	Able to understand the tidal application	Accuracy in understanding the tidal application	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45']		Tidal Applications in the Geomatics field; Tidal Applications in the Non Geomatics field	5
4 – 5	Able to observe tides directly	Accuracy in observing tides directly	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [2 x 45']		Tide Staff; Mechanic; Acoustic GPS; tide Radar	10
6 – 7	Able to understand the functions of tidal harmonics	Accuracy in understanding the functions of tidal harmonics	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [2 x 45']		Tidal component; Tidal harmonic function; Tidal period; Tidal amplitude; Tidal phase	10
8	**Midterm Evaluation / Midterm Exam**						
9	Able to understand the characteristics of tides	Accuracy in understanding the characteristics of tides	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45']		Tidal Characteristics; Formahzl number; Semidiurnal; Diurnal; Mix sc	10

10 – 11	Able to calculate the tidal components using the Admiralty method	Accuracy in calculating the tidal components using the Admiralty method	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Practice [1 x 45'] 4. Assigntment [1 x 45']		Doodsoon Rules for the Admiralty; 15 and 29 Methods of Accuracy	20
12 – 13	Able to calculate the tidal components using the Least Square method	Accuracy in calculating the tidal components using the Least Square method	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Practice [1 x 45'] 4. Assigntment [1 x 45']		Least Square; Alignment Parameter; Accuracy	20
14 – 15	Able to calculate tidal predictions in the future	Accuracy in calculating tidal predictions in the future	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Practice [1 x 45'] 4. Assigntment [1 x 45']		Harmonic Function; Prediction; Accuracy of prediction	20
16	**Final Semester Evaluation / Final Semester Examination**						**100**