



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

**Document  
Code**

**SEMESTER LEARNING PLAN (SLP)**

COURSE NAME		CODE	COURSE GROUP	CREDITS (SKS)		SEMESTER	Date of Preparation
Hydrographic Survey		CM235025	Geomarine	T=2	P=1	5	-
AUTHORIZATION		SLP Developer		Course Group Coordinator		Head of Study Program	
		Dr. Khomsin, S.T., M.T.		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-5	Able to design survey and mapping activities using the latest technology in the fields of Geodesy and Surveying, Hydrography, Photogrammetry and Remote Sensing also Geographic Information Systems and Cadastral.					
	ELO-6	Able to identify, formulate, analyze and solve problems in the fields of Geodesy and Surveying, Hydrography, Photogrammetry and Remote Sensing also Geographic Information Systems 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 and Surveying, Hydrography, Photogrammetry and Remote Sensing also Geographic Information Systems and Cadastral.					
	Course Learning Outcomes (CLO)						
	CLO-1	Students know the concepts, theories and applications of hydrographic surveys					
	CLO-2	Students are able to plan hydrographic surveys					
	CLO-3	Students are able to process tidal data to determine datum charts					
	CLO-4	Students are able to measure horizontal positions in the sea					
	CLO-5	Students are able to measure the depth of the survey with various methods (mechanical, acoustic, non-acoustic)					
	CLO-6	Students are able to draw hydrographic maps					

		<b>Matrix ELO-CLO</b>			
		CLO	ELO-5	ELO-6	ELO-7
		CLO-1	V		
		CLO-2		V	
		CLO -3		V	
		CLO -4			V
		CLO-5			V
		CLO-6			V
<b>Course Description</b>	This lecture focuses on hydrography, navigation, and hydrographic surveying. This lecture provides students with an understanding of the concepts of coordinates, measurements, underwater acoustics, positioning, sound waves, and various sources of hydrographic data and information. Students learn about surveying technologies, development, and hydrographic applications. This lecture is designed to bridge the study of geography, coastal and marine, oceanography, digital mapping, hydrographic surveying, marine spatial planning, remote sensing, and Geographic Information Systems (GIS). Practical experience with hydrographic charts and tidal tables for navigation provides an opportunity to introduce students to skilled fields that can form the basis for future careers.				
<b>Course Materials</b>	<ol style="list-style-type: none"><li>1. Definition, theory and application of hydrographic surveys</li><li>2. Hydrographic Survey Planning</li><li>3. Vertical datum and datum chart</li><li>4. Horizontal positioning at sea</li><li>5. Depth measurement methods in the ocean (acoustic and non-acoustic)</li><li>6. Hydrographic maps and bathimetric maps</li></ol>				
<b>References</b>	<b>Main :</b>				
	<ol style="list-style-type: none"><li>1. IHO., 2008. IHO Standards for Hydrographic Survey. 5th Edition. Special Publication 44. Monaco</li><li>2. Poerbandono., Djunarsjah, E. 2005. Survei Hidrografi. Bandung: Refika Aditama</li><li>3. IHO., 2005. Manual On hydrography. Monaco. International Hydrographic Beareau</li></ol>				
	<b>Additional :</b>				
	<ol style="list-style-type: none"><li>1. Umbach, M.J. 1976. Hydrographic Manual Fourth Edition. U.S. Department of Commerce</li><li>2. Ingham, A., Abbott, V., 1992. Hydrographic Surveying, 3rd ed., Blackwell Scientific, Cambridge, MA 02142.</li></ol>				
<b>Lecturer</b>	<ol style="list-style-type: none"><li>1. Danar Guruh Pratomo, S.T., M.T., Ph.D.</li><li>2. Khomsin, S.T., M.T.</li><li>3. Cherie Bhekti Pribadi, S.T., M.T.</li></ol>				
<b>Prerequisite</b>	Advanced Terestris Mapping				

Class/ Week	Lesson Learning Outcome (Sub-CLO)	Valuation		Learning Forms, Learning Methods, Student Assignments /Task, [ Estimated Time ]		Learning Materials [ References ]	Weight (%)
		Indicators	Criteria	Offline	Online		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to explain the concepts, theories and definitions of hydrographic surveys. In addition, students must also be able to explain the application of hydrographic surveys in the fields of geomatics and non-geomatics	Accuracy and accuracy in explaining definitions, concepts and theories about hydrography and hydrographic surveys and their applications in the fields of geomatics and non-geomatics	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [1 x 50'] 2. Presentation [1 x 50'] 3. Discussion [1 x 50']		1. Hydrographic definition 2. Hydrographic theory 3. The concept of hydrographic survey 4. Hydrographic applications and hydrographic surveys	5
2	Students are able to distinguish between hydrographic maps and topographic maps	Accuracy and accuracy in distinguishing between hydrographic maps and topographic maps	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [1 x 50'] 2. Presentation [1 x 50'] 3. Discussion [1 x 50']		1. Hydrographic Map 2. Topographic Map	5
3 – 4	Students are able to understand horizontal positioning in the sea	Accuracy and accuracy in explaining the methods used in horizontal	1. Completeness of the material 2. Depth of explanation and	1. Lecture [2 x 50'] 2. Precedent [2 x 50'] 3. Discussion [2 x 50']		1. LOP (Line of Position) Traverse 2. Bonding to the face 3. Backward bonding 4. GNSS RTK	10

		positioning during hydrographic surveys at sea	effectiveness of communication 3. Attitude accuracy			5. Differential GNSS	
5	Students are able to understand depth determination with non-acoustic methods	Accuracy and accuracy in determining sea depth by non-acoustic methods	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [1 x 50'] 2. Presentation [1 x 50'] 3. Discussion [1 x 50']		1. Lead Line 2. Sounding Pole 3. Airborne Lidar Topometry 4. Remote Sensing	5
6 – 7	Students are able to understand underwater acoustic waves	Precision and accuracy in understanding underwater acoustic waves	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [2 x 50'] 2. Precedent [2 x 50'] 3. Discussion [2 x 50']		1. Acoustic Wave Theory 2. Underwater Acoustic Wave Propagation 3. Signal to Noise Ratio 4. Fast Propagation of Sound Waves 5. Reflection and Backscattering 6. Acoustic Wave Formation (Beamforming) 7. Noise and Acoustic Signals	15
8	<b>Midterm Evaluation / Midterm Exam</b>						<b>40</b>
9	Students are able to understand the concept of tides	Accuracy and accuracy in explaining the theory and concept of tides	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [1 x 50'] 2. Discussion [1 x 50'] 3. Practicum [1 x 50']		1. Peg Theory 2. Peg Generator Style 3. Declination of the Moon and Sun 4. Ampidromic Point and Cotidal Line Characteristics of Pegs	10

<b>10 – 11</b>	Students are able to understand the function and analysis of tidal harmonics, tidal prediction and datum charts	Accuracy and accuracy in explaining the function and harmonic analysis of stakes to determine the components of pgs and datum charts as well as peg prediction	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [2 x 50'] 2. Presentation[2 x 50'] 3. Discussion [2 x 50']		1. Harmonic Function 2. Harmonic Analysis 3. Peg Components 4. Pasut constant 5. Stake Prediction Datum Chart	15
<b>12 – 13</b>	Students are able to understand depth determination by acoustic method (SBES)	Accuracy and accuracy in determining the depth of the sea by acoustic method	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [2 x 50'] 2. Presentation[2 x 50'] 3. Discussion [2 x 50']		1. Acoustic Signal Emission 2. Acoustic Signal Parameters 3. Beamwidth 4. Bandwidth 5. Linear Regression	15
<b>14</b>	Students are able to calculate hydrographic survey data and make hydrographic maps	Accuracy and accuracy in calculating hydrographic survey data and making hydrographic maps	1. Completeness of the material 2. Depth of explanation and effectiveness of communication 3. Attitude accuracy	1. Lecture [1 x 50'] 2. Presentation[2 x 50'] 3. Discussion [2 x 50']		1. Peg Correction 2. Barcheck Correction 3. Datum Chart Correction 4. Transducer Draft Correction 5. Batymetric contour 6. Nautical Chart	10
<b>15</b>	Students are able to plan hydrographic surveys	Accuracy and accuracy in planning hydrographic surveys in the field	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 50'] 2. Discussion [1 x 50'] 3. Exercise [1 x 50']		1. Hydrographic Survey Management 2. Hydrographic Survey Planning	10

			3. Attitude accuracy				
16	Final Semester Evaluation / Final Semester Examination						100