	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**
Applied Remote Sensing	CM234973	Geospatial	**T=2**	**P=1**	Elective Course	-

AUTHORIZATION	**SLP Developer**	**Course Group Coordinator**	**Head of Study Program**
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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, 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-10	Able to work in inter-disciplinary and inter-cultural teams so they can compete at national and international levels.
Course Learning Outcomes (CLO)	
CLO-1	Students are able to understand the concept of atmospheric correction and practice it using several methods
CLO-2	Students are able to extract parameter information in waters, land and the atmosphere from their spectral data

Matrix ELO – CLO

CPMK	ELO-6	ELO-7	ELO-10
CLO-1	v		v
CLO-2	v	v	v

Course Description	This course contains the processing and utilization of the advanced stages of spatial data recorded using extra-terrestrial through satellite
Course Materials	1. Radiometric Correction 2. Remote Sensing Water Monitoring 3. Remote Sensing For Land Monitoring 4. Remote Sensing For Atmospheric Studies
References	**Main:**
	1. Weng, Qihao, ed. Remote Sensing for Sustainability. CRC Press, 2016. 2. Lillesand, Thomas, Ralph W. Kiefer, and Jonathan Chipman. Remote sensing and image interpretation. John Wiley & Sons, 2014. 3. Martin, Seelye. An introduction to ocean remote sensing. Cambridge University Press, 2014. 4. Canty, Morton J. Image analysis, classification and change detection in remote sensing: with algorithms for ENVI/IDL 5. Barrett, Eric C. Introduction to environmental remote sensing. Routledge, 2013.
	Additional :
	1. Weng, Qihao, ed. Remote sensing of impervious surfaces. CRC Press, 2007. 2. Stephens, Graeme L. Remote sensing of the lower atmosphere. Vol. 1994. New York: Oxford University Press, 1994.
Lecturer	1. Prof. Lalu Muhamad Jaelani, S.T., M.Sc., Ph.D.
Prerequisite	Remote Sensing

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	Atmospheric Correction Concept		1. Completeness of the material 2. Depth of explanation and	1. Lecture [1 x 50'] 2. Discussion [1 x 50']		•	5

			effectiveness of communication				
2	Atmospheric Correction Method with DOS 2. Atmospheric Correction Method with Apparent Reflectance	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion [1 x 50'] 3. Task [1 x 50']			5
3	- Correction Method with 6SV and FLAASH. - Comparative analysis of several atmospheric correction methods	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion [2 x 50']			5
4	- Remote Sensing Concepts for Aquatic Studies. - Extraction of the main parameters of water quality (Chlorophyll-a) by remote sensing - Relationship between Chlorophyll-a and water pollution levels	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/Exercise [1 x 50']			5
5	- Extraction of the main water quality parameters (Chlorophyll-a)		1. Completeness of the material 2. Depth of explanation and	1. Lecture [2 x 50'] 2. Discussion [2 x 50']			10

	using remote sensing - Relationship between TSS and water pollution levels		effectiveness of communication				
6	- Extraction of Sea Surface Temperature (SST) using remote sensing - Relationship between SST and main water quality parameters		1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/Exercise [1 x 50']			10
7	- Remote sensing concept for land - Extraction of information from imagery: Spectral Index (Vegetation, Fire)		1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/Exercise [1 x 50']			10
8	**Midterm Evaluation / Midterm Exam**						**50**
9	- Remote sensing data used in the extraction of Land Surface Temperature information. - Extraction of information on Land	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response [1 x 50']			5

	Surface Temperature and impervious objects						
10	- Extraction of drought index information - Dry Land Mapping	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/exercise [1 x 50']			5
11	- Analysis of the distribution of the drought index. - Validation of Dry Land	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/exercise [1 x 50']			5
12	- Remote sensing concept for the atmosphere - Remote sensing data used in the extraction of atmospheric object information - Examples of atmospheric objects: PM10, PM2.5, SO, CO2, and NOx	1.	1. Completeness of the material 2. Depth of explanation and effectiveness of communicatio n	1. Lecture [1 x 50'] 2. Discussion, Task [1 x 50']			5
13	- Estimation of atmospheric objects (PM10, PM2.5, SO, CO2, and NOx) using	2.	1. Completeness of the material 2. Depth of explanation and	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/exercise [1 x 50']			10

	air quality models or algorithms - Validate air quality data (air pollutants		effectiveness of communication				
14	- The concept of weather anomalies and extreme weather - Remote sensing data used in weather anomaly information - Relationship between weather anomalies and atmospheric object parameters, for example: LST, SST, Water Vapor, etc	3.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/exercise [1 x 50']			10
15	- Detection of weather anomalies and their relationship with atmospheric objects (LST, SST, Water Vapor, etc.) in a time series - Relationship between weather anomalies and (estimated) rainfall and natural phenomena that	4.	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 50'] 2. Discussion, Task [1 x 50'] 3. Response/exercise [1 x 50']			10

	occur, for example; smog, volcanic eruptions, extreme weather, etc.						
16	**Final Semester Evaluation / Final Semester Examination**						**100**