	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**
Geospatial Artificial Intelligence	CM234994	Geoinformatics	**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 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.
	ELO-9	Able to plan, perform and evaluate the process of surveying and mapping activities using the latest technology in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.
	Course Learning Outcomes (CLO)	
	CLO-1	Students are able to understand the basic principles of geospatial artificial intelligence: k-nearest neighbors, inverse distance weighting
	CLO-2	Students are able to understand spatial data management using spatial databases and big data platforms
	CLO-3	Students are able to explain data mining techniques and their use in analyzing geomatic data
	CLO-4	Students are able to analyze spatial data using data mining, machine learning, and deep learning algorithms
	CLO-5	Students are able to test models through validation and criticize their reliability.

Matrix ELO – CLO

CPMK	ELO-6	ELO-7	ELO-9
CLO-1	V		
CLO-2		V	
CLO-3		V	
CLO-4			V
CLO-5	V		

Course Description	The overarching aim of the course is to introduce the student to new paradigms in data management with a special focus on artificial intelligence (AI) and machine learning (ML) and their application in GIS and remote sensing. After completing this course, the students can explain differences between knowledge-based and data-driven methods for spatial analysis. Students also can account for how technologies based on artificial intelligence and machine learning methods can be relevant for applications in GIS and remote sensing.
Course Materials	1. The basic principles of geospatial artificial intelligence 2. Spatial databases and big data platforms 3. Data mining techniques 4. Object Detection and Semantic Segmentation 5. Machine learning, and deep learning algorithms
References	**Main:** 1. Geodesy 4th. 2012. W.Torge 2. Physical Geodesy. 2005. Hoffmann-Wellenhof and Helmut Moritz 3. Satellite Geodesy. 2003. Gunter Seeber 4. Satellite Radar Interferometry. VBH Ketelaar. Springer 5. Geodynamics. Donald. Lturcotte Gerald Schubert. Cambride **Additional :** -
Lecturer	1. Hepi Hapsari Handayani, S.T., M.Sc., Ph.D. 2. Dr. Muhammad Aldila Syariz, S.T., M.S., 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	Able to explain the basic principles of geospatial artificial intelligence	Accuracy in explaining the basic principles of geospatial artificial intelligence	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Response [1 x 45']		The basic principles of geospatial artificial intelligence: k-nearest neighbors, inverse distance weighting	10
2 – 3	Able to understand the Spatial databases and big data platforms	Accuracy in understanding the Spatial databases and big data platforms	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Task [1 x 45']		Spatial databases and big data platforms	15
4 – 5	Able to understand the Data mining techniques and their use in analyzing geomatic data	Accuracy in understanding the Data mining techniques and their use in analyzing geomatic data	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [2 x 45'] 2. Discussion [1 x 45']		Data mining techniques and their use in analyzing geomatic data	10
6 - 7	Able to understand Object Detection and Semantic Segmentation	Accuracy in understanding Object Detection and Semantic Segmentation	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion, Task [1 x 45'] 3. Response/Exercise [1 x 45']		Object Detection and Semantic Segmentation	15
8	**Midterm Evaluation / Midterm Exam**						**50**
9 – 11	Able to Analyze spatial data	Accuracy in Analyzing spatial data	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Response [1 x 45']		Analyze spatial data using data mining, machine learning, and deep learning algorithms	25

12 – 15	Able to understand the Test models through validation and criticize their reliability.	Accuracy in understanding the Test models through validation and criticizing their reliability	1. Completeness of the material 2. Depth of explanation and effectiveness of communication	1. Lecture [1 x 45'] 2. Discussion [1 x 45'] 3. Response [1 x 45']		Test models through validation and criticize their reliability.	25
16	**Final Semester Evaluation / Final Semester Examination**						**100**