		Document Code
	Universitas Negeri Surabaya **Faculty of Social and Legal Sciences** **Geography Education Undergraduate Study Program**	

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Advanced Analysis Sig	8720202156	Compulsory Curriculum Subjects - National	T=2	P=0	ECTS=3.18	3	July 17, 2024

AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**

PLO-5	Able to make appropriate decisions to solve educational problems and transformative geography learning by utilizing various learning resources based on science and technology and the arts
PLO-7	Able to make appropriate decisions to resolve regional problems in a spatial context based on an integrated geographic approach

Program Objectives (PO)

PO - 1	Apply GIS to analyze maps
PO - 2	Examining GIS for spatial analysis and spatial statistics
PO - 3	Building interactive WebGIS related to spatial analysis
PO - 4	Building interactive WebGIS related to spatial statistics

PLO-PO Matrix

P.O	PLO-5	PLO-7
PO-1		
PO-2		
PO-3		
PO-4		

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PO-1																
PO-2																
PO-3																
PO-4																

Short Course Description	The Advanced Geographic Information Systems course explains the concepts and analysis procedures in GIS. The material in this GIS course is some of the competencies that must be mastered by Principal Technicians or Geographic Information Systems Analysts, in addition to the material in the Basic GIS and Geospatial Data Management courses. The material in this course is in line with the Ministry of Manpower Decree number 95 of 2017 (SKKNI Indonesia Category of Professional, Scientific and Technical Activities, Main Group of Architectural and Engineering Activities; Technical Analysis and Testing in the Field of Geospatial Information).

References	**Main :**

1. Esri. 1996. Introduction to Map Design. Esri Inc New York.
2. Fortin, M, J,. Dale, M, .2005. Spatial Analysis a Guide for Ecologist. Cambridge University Press.
3. Fotheringham, S, Rogerson, P,. 2005. Spatial Analysis and GIS. London: Taylor & Francis.
4. Lloyd, C, D,. 2011. Local Models For Spatial Analysis, Second Edition. New York: CRC Press, Taylor & Francis Group.
5. QGIS Project. 2013. QGIS User Guide. QGIS Project.
6. Riester, J,. 2008. Introduction to Topographic Maps. Geospatial Training and Analysis Cooperative.
7. Sanders, L,. 2007. Models in Spatial Analysis. London: ISTE Ltd.
8. Stillwell, J, Clarke, G,. 2004. Applied GIS and Spatial Analysis. England: John Wiley & Sons.
9. The MapServer Team. 2015. MapServer Open Source Web Mapping 13 MapServer Documentation Release 6.4.1.

Supporters:

1. https://www.youtube.com/BelajarQGIS/videos

Supporting lecturer	Dr. Muzayanah, S.T., M.T. Dr. Eko Budiyanto, S.Pd., M.Si. Mohammad Daman Huri, S.Pd., M.Sc. Putu Wirabumi, S.Si., M.Sc.						
Week-	**Final abilities of each learning stage (Sub-PO)**	**Evaluation**		**Help Learning, Learning methods, Student Assignments, [Estimated time]**		**Learning materials [References]**	**Assessment Weight (%)**
		Indicator	**Criteria & Form**	**Offline (offline)**	**Online (online)**		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Examining the concept of spatial analysis, understanding and methods of spatial analysis	1.Accurate study of the concept of spatial analysis, meaning and methods of spatial analysis 2.Understand definition of spatial analysis, spatial analysis method description	**Criteria:** 1.Minimum Completeness Criteria (KKM): > 65 2.Learning Process Assessment 3.Assessment of Learning Outcomes **Form of Assessment** : Participatory Activities	1. Lecture 2. Question and Answer 3. Discussion 2 X 50		**Material:** Spatial analysis **References:** *Fortin, M, J,. Dale, M, .2005. Spatial Analysis a Guide for Ecologist. Cambridge University Press.*	5%
2	Examining types of spatial patterns from spatial analysis	1.The accuracy of the study regarding the types of spatial patterns from spatial analysis 2.Understand spatial autocorrelation (Moran's I, geary contiguity ratio), spatial index	**Criteria:** 1.Minimum Completeness Criteria (KKM): > 65 2.Learning Process Assessment 3.Assessment of Learning Outcomes **Form of Assessment** : Project Results Assessment / Product Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Group Assignment 2 X 50		**Material:** Morans I method Geary Contiguity, Ratio method, Spatial Indexing method **Library:** **Material:** Spatial analysis **Bibliography:** *Lloyd, C, D,. 2011. Local Models For Spatial Analysis, Second Edition. New York: CRC Press, Taylor & Francis Group.* **Material:** Spatial analysis **References:** *Sanders, L,. 2007. Models in Spatial Analysis. London: ISTE Ltd.* **Material:** Spatial analysis **Library:** *https://www.youtube.com/...*	5%
3	Examining the relationship between the concept of analytical relationship types and spatial analysis	1.The accuracy of the study regarding the relationship between the concept of analytical relationship types and spatial analysis 2.Understand spatially weighted classification, overlay techniques, and spatial regression methods	**Criteria:** 1.Minimum Completeness Criteria (KKM): > 65 2.Learning Process Assessment 3.Assessment of Learning Outcomes **Form of Assessment** : Project Results Assessment / Product Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Group Assignment 2 X 50		**Material:** Spatial analysis models **References:** *Lloyd, C, D,. 2011. Local Models For Spatial Analysis, Second Edition. New York: CRC Press, Taylor & Francis Group.* **Material:** Spatial analysis **Library:** *https://www.youtube.com/...*	5%
4	Examining the concept of spatial prediction from spatial analysis	1.The accuracy of the study regarding the concept of spatial prediction from spatial analysis 2.Students can analyze the potential of the area based on point interpolation, krigging, and curve fitting methods.	**Criteria:** 1.Minimum Completeness Criteria (KKM): > 65 2.Learning Process Assessment 3.Assessment of Learning Outcomes **Form of Assessment** : Project Results Assessment / Product Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Group Assignment 2 X 50		**Material:** Interpolation **Literature:** *Sanders, L,. 2007. Models in Spatial Analysis. London: ISTE Ltd.* **Material:** Spatial analysis **Library:** *https://www.youtube.com/...*	5%

			Criteria:				
5	Building spatial models to solve spatial problems	1. Accuracy of building spatial models to solve spatial problems 2. Student develops a spatial model	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment **Form of Assessment**: Portfolio Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Individual Assignment 2 X 50		**Material:** Spatial statistics **References:** *Stillwell, J, Clarke, G,. 2004. Applied GIS and Spatial Analysis. England: John Wiley & Sons.* **Material:** Spatial statistics **Library:** *https://www.youtube.com/...*	5%
6	Examining concepts and methods in morphological analysis	1. Accurate study of concepts and methods in morphological analysis 2. Students can analyze morphological landscapes based on Basic terrain analysis, morphometry - profiling methods, and hydrological analysis.	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Portfolio Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Individual Assignment 2 X 50		**Material:** Concepts and methods of morphological analysis **References:** *Riester, J,. 2008. Introduction to Topographic Maps. Geospatial Training and Analysis Cooperative.* **Material:** Morphological analysis **Library:** *https://www.youtube.com/...*	5%
7	Analyze the concepts and methods of network analysis	1. Accuracy of analysis regarding network analysis concepts and methods 2. Students analyze transportation network in Surabaya based on Nearest - Fastest route, route density, and analyze location	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Project Results Assessment / Product Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Group Assignment 2 X 50		**Material:** Network analysis **Bibliography:** *Stillwell, J, Clarke, G,. 2004. Applied GIS and Spatial Analysis. England: John Wiley & Sons.* **Material:** Network analysis **Library:** *The MapServer Team. 2015. MapServer Open Source Web Mapping 13 MapServer Documentation Release 6.4.1.*	5%

No	Study Materials	Indicators	Assessment Criteria & Form	Learning Method	Time	Learning Resources	Weight
8	UTS	Accuracy according to the assessment rubric	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Project Results Assessment / Product Assessment		LMS SIDIA 2 X 50	**Material:** Meetings 1 to 7 **References:** *Esri. 1996. Introduction to Map Design. Esri Inc. New York.* **Material:** Meetings 1 to 7 **References:** *Fortin, M, J,. Dale, M, .2005. Spatial Analysis a Guide for Ecologist. Cambridge University Press.* **Material:** Meetings 1 to 7 **References:** *Fotheringham, S, Rogerson, P,. 2005. Spatial Analysis and GIS. London: Taylor & Francis.* **Material:** Meetings 1 to 7 **References:** *Lloyd, C, D,. 2011. Local Models For Spatial Analysis, Second Edition. New York: CRC Press, Taylor & Francis Group.* **Material:** Meetings 1 to 7 **References:** *Riester, J,. 2008. Introduction to Topographic Maps. Geospatial Training and Analysis Cooperative.* **Material:** Meetings 1 to 7 **References:** *Sanders, L,. 2007. Models in Spatial Analysis. London: ISTE Ltd.* **Material:** Meetings 1 to 7 **References:** *Stillwell, J, Clarke, G,. 2004. Applied GIS and Spatial Analysis. England: John Wiley & Sons.* **Material:** Meetings 1 to 7 **Library:** *https://www.youtube.com/...*	10%
9	Examining spatial statistics based on the Ordinary Least Square (OLS) method	1. The accuracy of the study of spatial statistics based on the Ordinary Least Square (OLS) method 2. Students develop analysis of the area based on Ordinary Least Square (OLS) techniques and describe phenomena	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Portfolio Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Individual Assignment 2 X 50		**Material:** Spatial statistics **References:** *Stillwell, J, Clarke, G,. 2004. Applied GIS and Spatial Analysis. England: John Wiley & Sons.* **Material:** OLS **Library:** *https://www.youtube.com/...*	5%
10	Examining spatial statistics based on the Geographic Weighting Regression (GWR) method	1. The accuracy of the study regarding spatial statistics is based on the Geographic Weighting Regression (GWR) method 2. Students develop analysis of the area based on Geographic Weighting Regression (GWR) and describe the phenomenon	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Portfolio Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Individual Assignment 2 X 50		**Material:** Spatial statistics **References:** *Stillwell, J, Clarke, G,. 2004. Applied GIS and Spatial Analysis. England: John Wiley & Sons.* **Material:** GWR **Library:** *https://www.youtube.com/...*	5%

11	Analyze concepts and techniques in WebGIS	1. Accuracy of concept and technique analysis in WebGIS 2. Students can describe of WebGIS definitions, elements, procedures, and techniques to build a WebGIS	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Participatory Activities, Project Results Assessment / Product Assessment	1. Lecture 2. Question and Answer 3. Discussion 2 X 50		**Material:** WebGIS **Library:** *https://www.youtube.com/...*	5%
12	Examines online databases and techniques for managing spatial data	1. Accuracy of research regarding online databases and techniques for managing spatial data 2. Students can develop online databases based on phpMyAdmin, MySQL, and build a GeoJSON data	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Portfolio Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Individual Assignment 2 X 50		**Material:** WebGIS **Library:** *https://www.youtube.com/...*	5%
13	Analyzing interactive WebGIS techniques	1. Accuracy of analysis regarding interactive WebGIS techniques 2. Students can visualize spatial data online and build modules of searching and manipulating spatial data	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Portfolio Assessment	1. Lecture 2. Question and Answer 3. Discussion 4. Individual Assignment 2 X 50		**Material:** WebGIS **Library:** *https://www.youtube.com/...*	5%
14	Building an interactive WebGIS related to spatial analysis	1. Accuracy of building interactive WebGIS related to spatial analysis 2. Students can implement spatial analysis methods on WebGIS	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Assessment of Project Results / Product Assessment, Practices / Performance	1. Lecture 2. Question and Answer 3. Discussion 4. Group Assignment 2 X 50		**Material:** WebGIS **Library:** *https://www.youtube.com/...* **Material:** WebGIS **Library:** *The MapServer Team. 2015. MapServer Open Source Web Mapping 13 MapServer Documentation Release 6.4.1.*	10%
15	Building an interactive WebGIS related to spatial statistics	1. The accuracy of building interactive WebGIS is related to spatial statistics 2. Students can implement spatial analysis methods on WebGIS	**Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment**: Assessment of Project Results / Product Assessment, Practices / Performance	1. Lecture 2. Question and Answer 3. Discussion 4. Group Assignment 2 X 50		**Material:** WebGIS **Library:** *https://www.youtube.com/...* **Material:** WebGIS **Library:** *The MapServer Team. 2015. MapServer Open Source Web Mapping 13 MapServer Documentation Release 6.4.1.*	10%

| 16 | Final Semester Examination (UAS) | Accuracy according to the assessment rubric | **Criteria:** 1. Minimum Completeness Criteria (KKM): > 65 2. Learning Process Assessment 3. Assessment of Learning Outcomes **Form of Assessment** : Project Results Assessment / Product Assessment | | LMS SIDIA 2 x 50 | **Material:** WebGIS **Library:** *https://www.youtube.com/...* **Material:** WebGIS **Library:** *The MapServer Team. 2015. MapServer Open Source Web Mapping 13 MapServer Documentation Release 6.4.1.* | 10% |

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	7.5%
2.	Project Results Assessment / Product Assessment	52.5%
3.	Portfolio Assessment	30%
4.	Practice / Performance	10%
		100%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.