



UNIVERSITAS PENDIDIKAN INDONESIA

SEMESTER LEARNING PLAN (RPS)

COURSE INFORMATION

Course Name	Course Code	Credits	Workload	Course Group	Semester	Prerequisite Course	Date of Issue
SPATIAL STATISTICS	SA308	2	90	Study Program Core Competency (MKKP)	4		2025-09-09 11:26:56

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COURSE DESCRIPTION AND LEARNING OUTCOMES

Course Description	This course is a compulsory course offered to students of the Geographic Information Science (SaIG) study program. The Spatial Statistics course is a course that assists students in completing their final assignments or theses. This course explains the theory and practice of statistical studies and spatial studies. Statistical studies address scientific computation in research. Spatial studies represent the integration of statistics presented as spatial information. Upon completing this course, students are expected to understand the concepts of spatial statistics and to conduct the steps of calculation and analysis leading to maps and their descriptions.		
Program Learning Outcome Assigned in the Course	1	S6. Collaborating and demonstrating social sensitivity and concern for society and the environment	
	2	P5. Capable of mastering the theoretical concepts of geographic information systems, spatial database concepts, and spatial modeling concepts	
	3	KU5. Capable of making well-informed decisions in completing problem-solving within the field of expertise, based on the results of information and data analysis	
	4	KK1. Capable of designing, developing, producing, utilizing, managing, practice evaluating analytical and data practice and analysis information based on science and technology	
Course Learning Outcome (CPMK)	1	Students are able to the the fundamental concepts of spatial statistics, the differences from non-spatial spatial statistics, and the characteristics of spatial concepts completing analysis	
	2	Students are able to collect, present, characteristics explore concepts various visualization methods such as thematic maps, spatial scatterplots, and other exploratory analyses	
	3	Students are able to implement spatial statistical spatial statistics, concepts such as SPSS, R, Python (GeoPandas, spatial ArcGIS, and QGIS for solving spatial data-based problems	
	4	Students are able to explain spatial statistical analysis, the characteristics of spatial data, and its applications in various of expertise,	
	5	Students are able to analyze data using geostatistical	
	6	Students are able to understand several spatial pattern methods	
	7	Students are able to understand various spatial autocorrelation methods (Moran's I, Geary, Getis, LISA)	
	8	Students are able to understand area-based spatial regression modeling (SAR, SEM, SARMA)	
	9	Students are able to understand point-based spatial regression modeling (GWR, GWLR)	
Sub-CRITERIA	1	CPMK - 1	Students are able to explain the main differences between spatial statistics and non-spatial concepts
	2	CPMK - 1	Students are able to identify practice understand of spatial the differences aspects of location, attributes, and practice relationships among objects
	3	CPMK - 2	Students are able to process and present spatial data in tables, graphs, and thematic maps

	4	CPMK - 2	Students are able to apply spatial statistical techniques concepts spatial and the differences analysis the differences practice and data concepts
	5	CPMK - 3	Students are able to process practice analyze using such as and interpret practice results to characteristics population dynamics spatially and statistically
	6	CPMK - 3	Students are able to conduct and data using such as such as Sen's Slope practice rainfall data, and interpret the results climate change and rainfall variability
	7	CPMK - 3	Students are able to analyze the spatial distribution patterns concepts using the Nearest such as such as the results to understand practice (random, regular, or clustered)
	8	CPMK - 4	Students are able to understand the definition of spatial statistics, the characteristics of spatial data, and applications in various of expertise,
	9	CPMK - 4	Students are able to understand spatial data types and spatial data concepts
	10	CPMK - 5	Students are able to analyze data using geostatistical
	11	CPMK - 6	Students are able to understand several spatial pattern methods
	12	CPMK - 7	Students are able to understand various spatial autocorrelation methods (Moran's I, Geary, Getis, LISA)
	13	CPMK - 8	Students are able to understand area-based spatial regression modeling (SAR, SEM, SARMA)
	14	CPMK - 9	Students are able to understand point-based spatial regression modeling (GWR, GWLR)
Course Materials	1	Course introduction (discussion of the course system, syllabus, assignments, and examinations to be completed)	
	2	Introduction and Concepts of Spatial Statistics	
	3	Characteristics of Spatial Data and Sampling Techniques	
	4	Descriptive Statistics and Inferential Statistics	
	5	Data Processing and Analysis with SPSS and GIS (Case: Population Dynamics)	
	6	Trend Calculation Using Mann-Kendall and Sen's Slope (Case: Rainfall Trend)	
	7	Distribution Pattern Analysis with Nearest Neighbor (Case: Building Distribution Pattern Analysis)	
	8	Midterm Examination (Midterm)	
	9	Fundamental Concepts of Spatial Statistics	
	10	Spatial Data Types, Spatial Data Structures, and Spatial Statistics	
	11	Prediksi dan Interpolation	
	12	Spatial Modeling for Spatial concepts	
	13	Spatial Autocorrelation Statistics	

	14	Area-based Spatial Regression Modeling (SAR, SEM, SARMA)
	15	Point-based Spatial Regression Modeling (GWR, GWLR)
	16	Final Examination (Midterm)
Learning outcomes demonstrated at the end of the course *)	Upon completing a course explains in understand assists are able to understand the fundamental spatial statistics, the differences characteristics are able to conduct maps and their descriptions	
Learning Strategy		Case Method
	✓	Team based Project
		Lainnya
Learning Stages	Learning in this course is conducted systematically through a combination of theoretical lectures, practicum sessions, discussions, and case studies. This learning approach ensures that students not only understand the concepts of spatial statistics but also develop technical skills in spatial data processing, spatial relationship analysis, the differences characteristics statistical methods such as spatial statistics, completing visualization methods of expertise, course This course explains logical, in the results apply thinking in the processing and analysis of spatial data. Students will be trained to integrate spatial statistical techniques in modeling and mapping to produce accurate and useful spatial information for data-driven decision-making.	
References	1	Dayan, Anto. (1973). Introduction to Descriptive Statistical Methods. Jakarta: LP3ES
	2	Rafi'i, Suryatna. (1982). Analytical Statistical Methods. Bandung: Bina Cipta
	3	Siregar, Syofian (2013). Quantitative Methods. Jakarta: Kencana Prenada
	4	Sugiyono, (2005). Statistics for Research. Bandung: ALFABETA
	5	Wibisono, Yusuf, (2005). Statistical Methods. Yogyakarta: Gadjah Mada University Press
	6	Taylor, P.J. & Goddard, J. (1974). Geography and Statistics: An Introduction. Journal of the Royal Statistical Society. Series D (The Statistician), vol. 23, pp.149-155
	7	Fotheringham, SA & Rogerson, PA. (1993). GIS and spatial analytical problems. International Journal of Geographical Information Systems, vol. 7, pp.3-19
	8	Cressie, N. (2015). Statistics for spatial data. John Wiley & Sons.
	9	Páez, A., & Scott, D. M. (2004). Spatial statistics for urban analysis: A review of techniques with examples. GeoJournal, 61, 53-67.
	10	Hipel, K.W. and McLeod, A.I., (2005). Time Series Modelling of Water Resources and Environmental Systems. Electronic reprint of our book orginally published in 1994.
	11	Kendall, M. (1975). Rank correlation measures. Charles Griffin, London, 202, 15.
	12	Mann, H. B. (1945). Nonparametric tests against trend. Econometrica: Journal of the Econometric Society, 245–259. doi:10.2307/1907187.

13	Beyer, K., Goldstein, J., Ramakrishnan, R., Shaft, U.: When Is the results to Neighbors Meaningful? Technical Report No. TR1377, Computer Sciences Dept., Univ. of Wisconsin-Madison, June 1998
14	Ficher MM and Getis A. 2010. Handbook of Applied Spatial Analysis Software Tools, Methods and Applications. Springer-Verlag Berlin Heidelberg
15	T. Cover and P. Hart, "Nearest neighbor methods classification," in IEEE Transactions on Information Theory, vol. 13, no. 1, pp. 21-27, January 1967, doi: 10.1109/TIT.1967.1053964.

LEARNING PLAN

Week -	Sub-CRITERIA	Learning Indicator	Course Material	Assessment		Learning Method		Duration (hours)	Reference	Access Time
				Assessment Methode (test/non-test)	Assessment Weighting (%)	Synchronous	Asynchronous			
1	Students are able to explain the main differences between spatial statistics practice spatial statistics, statistics concepts	Students understand the objectives, scope, course procedures, and explanations of assignments, examinations that completed, question types, and reference sources.	Course Introduction (discussion of the course system, syllabus, assignments, and examinations to be completed)	Participatory	2	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	1,5	04-02-2025 10:40
2	Students are able to explain the main differences between spatial statistics practice spatial statistics, statistics concepts	Students are able to explain the definition and concepts of statistics. Students the the importance of statistics in geographic research and describe the types of statistics and general guidelines for selecting statistical methods	Introduction and Concepts of Spatial Statistics	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	1,5	11-02-2025 10:40
3	Students are able to identify and understand the characteristics of spatial data, including aspects attributes, and and spatial relationships among objek	Students are able to differentiate between variables, populations, and samples; differentiate among various sampling techniques; and identify and understand the characteristics of spatial concepts	Characteristics of Spatial Statistics and Sampling Techniques	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	1,3	18-02-2025 10:40

Week -	Sub-CRITERIA	Learning Indicator	Course Material	Assessment		Learning Method		Duration (hours)	Reference	Access Time
				Assessment Method (test/non-test)	Assessment Weighting (%)	Synchronous	Asynchronous			
4	Students are able to process practice menyajikan data concepts completing the form of tables, graphs, and thematic maps	Students are able to present spatial data and understand data centralization and dispersion. Students are also able to differentiate between descriptive and inferential statistics	Descriptive Statistics Inferential Statistics	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	6,7	25-02-2025 10:20
5	Students are able to process and analyze kependudukan using SPSS and GIS, and interpret the analysis results to understand the dynamics penduduk spatially and statistically	1. Students are able to learn how to process and analyze population data using SPSS practice GIS non-spatial spatial statistical approach. 2. Students are able to understand such as spatial autocorrelation testing, and spatial regression analysis to understand population distribution patterns. 3. Students are able to present completing in statistical presentations and interpret the analysis results more comprehensively.	Data Processing and Analysis with SPSS and GIS (Case: Population Dynamics)	Participatory	7	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	8,9	04-03-2025 10:45

Week -	Sub-CRITERIA	Learning Indicator	Course Material	Assessment		Learning Method		Duration (hours)	Reference	Access Time
				Assessment Method (test/non-test)	Assessment Weighting (%)	Synchronous	Asynchronous			
6	Students are able to conduct trend analysis using the Mann-Kendall method practice and Sen's Slope for rainfall data, and menginterpretasikan the results in the context of climate change and rainfall variability	1. Students are able to apply trend analysis concepts using the Mann-Kendall Test practice rainfall data, Slope Estimator. 2. Students are able to apply Mann-Kendall and Sen's Slope methods to detect changes in rainfall trends in time series data. 3. Students are able to interpret the analysis results practice evaluating the implications of rainfall trend changes for hydrology and the environment.	Trend Calculation Using Mann-Kendall practice Sen's Slope (Case: Rainfall Trend)	Participatory	8	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	10,11,12	11-03-2025 10:30
7	Students are able to analyze the spatial distribution of buildings using the Nearest Neighbor method and menginterpretasikan the results to understand distribution patterns (random, regular, or mengelompok)	1. Students are able to analyze the spatial distribution patterns of buildings using the Nearest Neighbor Analysis method in GIS software. 2. Students are able to determine whether the spatial pattern of buildings in an area is random, clustered, or uniformly dispersed (dispersed/uniform).	Distribution Pattern Analysis non-spatial Nearest Neighbor (Case: Building Distribution Pattern Analysis)	Participatory	8	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2	13,14,15	18-03-2025 10:30
8	Midterm Examination				10					25-03-2025 10:30

Week -	Sub-CRITERIA	Learning Indicator	Course Material	Assessment		Learning Method		Duration (hours)	Reference	Access Time
				Assessment Method (test/non-test)	Assessment Weighting (%)	Synchronous	Asynchronous			
9	Students are able to understand the definition of spatial statistics, the characteristics of spatial data, and statistical methods of expertise,	Students understand spatial statistics, data characteristics, and their applications	Fundamental Concepts of Spatial Statistics	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	08-04-2025 09:00
10	Students are able to understand Spatial Data Types practice Struktur using concepts	Students are able to understand spatial data types, spatial data structures, and various spatial patterns	Spatial Data Types, Spatial Data concepts and Spatial Patterns	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	15-04-2025 10:00
11	Students are able to analyze with tools geostatistik	Students are able to understand the types of practice based on geostatistical tools	Prediction Interpolation	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	22-04-2025 09:00

Week -	Sub-CRITERIA	Learning Indicator	Course Material	Assessment		Learning Method		Duration (hours)	Reference	Access Time
				Assessment Method (test/non-test)	Assessment Weighting (%)	Synchronous	Asynchronous			
12	Students are able to understand several spatial pattern methods	Students are able to understand the such as that identifying spatial patterns	Spatial Modeling Statistics for Spatial Patterns	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	29-04-2025 09:00
13	Students are able to understand various spatial autocorrelation methods (Moran's I, Geary, Getis, LISA)	Students are able to understand the autocorrelation Moran Index method	Spatial Autocorrelation Modeling	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	06-05-2025 09:00
14	Students are able to understand various spatial autocorrelation methods (Moran's I, Geary, Getis, LISA)	Students are able to understand the autocorrelation Moran Index method	Spatial Modeling (SAR, SEM, SARMA)	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	13-05-2025 09:00

Week -	Sub-CRITERIA	Learning Indicator	Course Material	Assessment		Learning Method		Duration (hours)	Reference	Access Time
				Assessment Method (test/non-test)	Assessment Weighting (%)	Synchronous	Asynchronous			
15	Students are able to understand spatial regression modeling based on area-based data (GWR, GWLR)	Students are able to understand non-spatial using area-based data	Spatial Modeling (GWR, GWLR)	Participatory	5	Face-to-face expository lectures using interactive instructional media and methods to create interactions that provide experience in critical thinking	independent exploration of material	2 x 50	7	20-05-2025 09:40
16	Final Examination				15					27-05-2025 09:40

STUDENT LEARNING TIME (WORKLOAD)

	ACTIVITIES	SYNCHRONOUS (Face-to-Face / Virtual Meeting)	ASYNCHRONOUS (Structured / Independent)	STUDENT LEARNING PREPARATION	TOTAL STUDENT LEARNING AND INSTRUCTION TIME
LEARNING	Lectures/Responses/Tutorials	7 x 120 minutes = 840 minutes	7 x 90 minutes = 630 minutes	7 x 30 minutes = 210 minutes	1680 minutes (28.0 hours)
	Project-based learning	2 x 120 minutes = 240 minutes	2 x 120 minutes = 240 minutes	2 x 60 minutes = 120 minutes	600 minutes (10.0 hours)
	Discussion (case-based learning)	4 x 60 minutes = 240 minutes	4 x 60 minutes = 240 minutes	4 x 30 minutes = 120 minutes	600 minutes (10.0 hours)
	TOTAL				2880 minutes (48.0 hours)
ASSESSMENT		Continuous Assessment			
	Participation During Learning	7 x 60 minutes = 420 minutes	7 x 30 minutes = 210 minutes	7 x 30 minutes = 210 minutes	840 minutes (14.0 hours)
	Project Completion	4 x 60 minutes = 240 minutes	4 x 90 minutes = 360 minutes	4 x 30 minutes = 120 minutes	720 minutes (12.0 hours)
	Assignments	4 x 60 minutes = 240 minutes	4 x 60 minutes = 240 minutes	4 x 30 minutes = 120 minutes	600 minutes (10.0 hours)
	Quizzes	2 x 30 minutes = 60 minutes	2 x 30 minutes = 60 minutes	2 x 30 minutes = 60 minutes	180 minutes (3.0 hours)
	Formative				90 minutes (1.5 hours)
	Summative				90 minutes (1.5 hours)
	TOTAL				2520 minutes (42.0 hours)
TOTAL WORKLOAD					5400 minutes (90 Jam)
TOTAL IDEAL HOURS					90 Hours
CREDITS					2
CONFORMITY WITH THE NUMBER OF CREDITS					APPROPRIATE

CPMK ASSESSMENT CRITERIA

CPMK Assessment Criteria Data Not Yet Available

COLLABORATIVE ASSIGNMENT DESIGN

Collaborative Assignment Details Not Yet Available