	SEMESTER LEARNING PLAN **DEPARTMENT OF GEOMATICS ENGINEERING** **FACULTY OF CIVIL, PLANNING, and GEO ENGINEERING**		
PROGRAM	**UNDERGRADUATE**		
COURSE NAME	**Spatial Data Computation and Programming**	**CODE**	**RM184304**
SEMESTER	**III (three)**	**CREDITS**	**3 (three)**
LECTURERS	**Hepi Hapsari Handayani [coord]**		
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COURSE MATERIALS	1	Basic Syntax
	2	Matrix Operations
	3	Chart
	4	Dynamic input and output
	5	Control
	6	Data analysis
	7	Function analysis
	8	File Interaction
	9	Calculations in statistics, teristris mapping and coordinate transformation
	10	Spatial data exploration in Graphical User Interface (GUI)
EXPECTED LEARNING OUTCOMES THAT IMPOSED IN THE COURSE	C	Able to identify, formulate, analyze and solve problems in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral
	D	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.
	E	Able to apply information & communication technology and the latest technological developments in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, geographic information systems, and cadastral.
	F	Able to compile scientific reports and provide solutions based on leadership, creativity and communication skills as well as being responsible for the work done.
COURSE LEARNING OUTCOMES	1	Students use the concepts and principles of natural science, as well as mathematical applications to make calculations based on spatial data.
	2	Students are able to use the Matlab or R programming language to do data processing and analysis in order to solve simple problems related to spatial.
	3	Students are able to solve simple problems that use technology in the fields of geodesy, surveying, hydrography, remote sensing, photogrammetry, geographic information systems, and cadastre also applying and analyzing in the Matlab or R programming language
	4	Students are able to prepare reports and present the results of data processing and analysis responsibly

ABILITY CATEGORIES	*Cognitive Prosecess*	*Analyse*
	Knowledge Domain	*Procedural*
	Psychomotor	*Conscious control*
	Affective	*Change of attitude*

Class	Lesson learning outcome	Criteria dan Assessment Indicator	Weight	Learning Materials	Learning Experience	Learning Methods	Estimated Time
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to explain the basic syntax of computer programming using the Matlab programming language	The accuracy of using the basic syntax of computer programming in Matlab	5%	Installing Matlab software	Lecture	Teacher-centered learning	1 x (3x50')
				Introduction to the Matlab work environment	Discussion	Student-centered learning	
				An explanation of the basic syntax in Matlab	Literature review	Problem-based learning	
2	Students are able to do the basic programming of matrix operations using Matlab	The accuracy of using matrix operations in Matlab	5%	Scalar, vector, and matrix	Lecture and Discussion	Teacher-centered learning	1 x (3x50')
				Matrix size	Practice	Student-centered learning	
				Special Matrix	Exercise : Programming a matrix	Problem-based learning	
				Index and matrix array			
				Reshaping the matrix			
3	Students are able to do programming for making graphics on Matlab	The accuracy of making 2-dimensional and 3-dimensional	10%	Line Chart	Lecture and Discussion	Teacher-centered learning	
				Determination of Line Type and Nets	Practice	Student-centered learning	

		graphics using the Matlab programming language		Graphic Plots for Matrixed Data	Exercise : Programming a graph	Problem-based learning	1 x (3x50')
				Making Special Plots			
				Making 3-dimensional plot			
4, 5	Students are able to create dynamic input and output programs to solve simple problems in the geomatics field using Matlab	The accuracy of creating dynamic input and output programs to solve simple problems in the geomatics field using Matlab	15%	Input and Output Format	Lecture and Discussion	Teacher-centered learning	2 x (3x50')
				Variables and strings	Practice	Student-centered learning	
				Basic dynamic programs such as trigonometry	Exercise : Programming dynamic input output	Problem-based learning	
				Dynamic program for simple problems for basic	Task-1		
6, 7	Students are able to make programs using simple control to solve simple mathematical calculations using Matlab	Accuracy in making program use control to solve simple mathematical calculations using Matlab	10%	Conditional statements if, else, and elseif	Lecture and Discussion	Teacher-centered learning	2 x (3x50')
				Conditional Statement if-else	Practice	Student-centered learning	
				Elseif Conditional Statement	Exercise : Programming control	Problem-based learning	
				Conditional statements if nested	Task-1		
				Switch and while statements			
				Looping for, continue and break			
				The control program for calculations in geomatics, for example, uses control for calculating correlations			
8	**Mid-Semester Evaluation**					**Written evaluation**	**2x50'**
						Discussion	**1x50'**
9	Students are able to create programs using complex control to solve calculations in the geomatics field using Matlab	Accuracy to make the program using complex control in order to solve calculation in the geomatics field using Matlab	5%	Maximum and minimum	Lecture and Discussion	Teacher-centered learning	1 x (3x50')
				Range and Total	Practice	Student-centered learning	
				Statistics	Exercise : Programming for statistical data analysis	Problem-based learning	
				Sort			
				Histogram			
10	Students are able to create programs for function analysis and interpolation using Matlab	Accuracy in making programs for function analysis and interpolation using Matlab	5%	Polynomials in Matlab	Lecture and Discussion	Teacher-centered learning	1 x (3x50')
				Minimum and Maximum of Functions	Practice	Student-centered learning	
				Minimum of Multi Variable Functions	Exercise : Programming control	Problem-based learning	
				Interpolation			
				Curve-fitting			
				Function Tool			
				Matlab program for first order polynomials in coordinate transformation			
11	Students are able to create programs using file interactions	Accuracy of making programs in Matlab using file interactions	5%	Interaction with formatted files	Lecture and Discussion	Teacher-centered learning	1 x (3x50')
				Open and close files	Practice	Student-centered learning	
				Open syntax and close syntax	Exercise : create a program using file interactions	Problem-based learning	
				Read the contents of the file			
12, 13	Students are able to performe calculations and analyze responsibly, applying statistics, terrestrial mapping and coordinate transformation using polynomial principles in Matlab based on dynamic input-output and controls.	Accuracy in performing calculations and analyzing responsibly, applying statistics, terrestrial mapping and coordinate transformation using polynomial principles in Matlab based on dynamic input-output and control controls.	10%	Descriptive statistics for spatial data analysis	Lecture and Discussion	Teacher-centered learning	2 x (3x50')
				Terrestrial mapping for horizontal and vertical control nets in both closed and open polygons	Practice	Student-centered learning	
				Matlab program uses dynamic input-output and complex control for statistical tests or coordinate transformations using first and second order polynomials	Task-3 (Group)	Problem-based learning	
14, 15	Students are able to explore spatial data responsibly in the Graphical User Interface (GUI)	Accuracy in exploring spatial data with the Graphical User Interface (GUI), responsibly	15%	Designing GUIs: graphs and tables	Lecture and Discussion	Teacher-centered learning	2 x (3x50')
				Objects and hierarchies in the GUI	Practice	Student-centered learning	
				Create figure / application window	Exercise : create GUI	Problem-based learning	

				Creating Uicontrol and Uipanel	Discussion for group task		
				Interaction between objects			
16	**Final Semester Evaluation**					**Evaluation: Final presentatio**	**1 x (3x50')**
						TOTAL	16x(3x50')