



INSTITUT TEKNOLOGI SEPULUH NOPEMBER
FAKULTAS SAINS DAN ANALITIKA DATA
PROGRAM STUDI SARJANA STATISTIKA
DEPARTEMEN STATISTIKA

Kode Dokumen

REV-1

RENCANA PEMBELAJARAN SEMESTER/
SEMESTER LEARNING PLAN

MATA KULIAH (MK)/ <i>Course</i>		KODE/ <i>Code</i>	Rumpun MK/ <i>Course Group</i>	BOBOT (sks)/ <i>Weight (credit)</i>		SEMESTER/ <i>Semester</i>	Tgl Penyusunan/ <i>Drafting Date</i>
MATRIKULASI KOMPUTASI STATISTIKA/ <i>COMPUTATIONAL STATISTICS (MATRICULATION)</i>		SS255091	Statistika Komputasi dan Sains Data	T=3	P=1	I	Agustus 2026
OTORISASI/ <i>AUTHORIZATION</i>		Pengembang RPS/ <i>RPS Developer</i>		Koordinator RMK/ <i>Course Group Coordinator</i>		Kepala PRODI/ <i>Head of Program</i>	
		Dr. Irhamah; Prof. Heri Kuswanto; Dr. Kartika F.; Adatul M., M.Si.; Shofi Andari, Ph.D.; Neni A. F., Ph.D.; Dr. A. Choiruddin; Novri Suhermi, M.Sc.		Prof. Drs. Nur Iriawan, M.Ikomp, M.Si		Irhamah, S.Si., M.Si., Ph.D.	
Capaian Pembelajaran (CP)/ <i>Learning Achievement</i>	CPL-PRODI yang dibebankan pada MK/ <i>PLO</i>						
	CPL-4 <i>PLO-4</i>	Mampu menganalisis dan mengintegrasikan Teori Statistika dalam merumuskan metode statistika yang inovatif untuk menyelesaikan permasalahan teoritis dan riil. <i>Able to analyze and integrate statistical theory to formulate innovative statistical methods for solving both theoretical and real-world problems.</i>					
	CPL-7 <i>PLO-7</i>	Mampu menganalisis dan mengevaluasi teknik komputasi statistik untuk memecahkan permasalahan statistika yang kompleks berbasis data <i>Able to analyze and evaluate statistical computing techniques to address complex, data-driven statistical problems</i>					
	CPL-8 <i>PLO-8</i>	Mampu menganalisis dan mengevaluasi metode statistika untuk merumuskan solusi pada permasalahan teoritis dan riil dengan pendekatan multidisipliner <i>Able to analyze and evaluate statistical methodologies to formulate solutions for theoretical and real-world problems using a multidisciplinary approach.</i>					
	Capaian Pembelajaran Mata Kuliah (CPMK)/ <i>CLO</i>						

	CPMK-1 Mampu menjelaskan struktur pemrograman R dan Python CPMK-2 Mampu menjelaskan dasar-dasar algoritma program statistika deskriptif dan mengimplementasikannya dalam program paket Statistika CPMK-3 Mampu menjelaskan dasar-dasar algoritma program komputasi pendugaan parameter satu, dua dan k populasi serta mengimplementasikannya dalam program paket Statistika CPMK-4 Mampu menjelaskan dasar algoritma program komputasi analisis regresi linier dan non linier serta pemeriksaan asumsi error dan mengimplementasikannya dalam program paket Statistika CPMK-5 Mampu memahami dasar algoritma program untuk komputasi regresi bootstrap dan jackknife dan mengimplementasikannya dalam program paket Statistika CPMK-6 Mampu memahami dasar algoritma pembangkitan bilangan acak dan mengimplementasikannya dalam program paket Statistika CPMK-7 Mampu berkomunikasi secara efektif dan bekerjasama dalam tim yang interdisiplin dan multidisiplin CLO-1 Able to explain the structure of R and Python programming CLO-2 Be able to explain the basics of descriptive statistics program algorithms and implement them in the Statistics package program CLO-3 Be able to explain the basics of computational program algorithms for parameter estimation of one, two and k populations as well implement it in the Statistics package program CLO-4 Be able to explain the basic algorithms of linear and non-linear regression analysis computational programs as well as checking error assumptions and implement them in the Statistics package program CLO-5 Able to understand basic program algorithms for computational bootstrap and Jackknife regression and implement them in the Statistics package program CLO-6 Able to understand the basic random number generation algorithm and implement it in the Statistics package program CLO-7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams																																																																																
	Matriks CPL – CPMK PLO-CLO Matrix <table><tr><th>CPMK/<i>CLO</i></th><th>CPL-1</th><th>CPL-2</th><th>CPL-3</th><th>CPL-4</th><th>CPL-5</th><th>CPL-6</th><th>CPL-7</th><th>CPL-8</th><th>CPL-9</th></tr><tr><td>CPMK-1/<i>CLO-1</i></td><td></td><td></td><td></td><td>√</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CPMK-2/<i>CLO-2</i></td><td></td><td></td><td></td><td>√</td><td></td><td></td><td>√</td><td></td><td></td></tr><tr><td>CPMK-3/<i>CLO-3</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>CPMK-4/<i>CLO-4</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>CPMK-5/<i>CLO-5</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>CPMK-6/<i>CLO-6</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>CPMK-7/<i>CLO-7</i></td><td></td><td></td><td></td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr></table>	CPMK/ <i>CLO</i>	CPL-1	CPL-2	CPL-3	CPL-4	CPL-5	CPL-6	CPL-7	CPL-8	CPL-9	CPMK-1/ <i>CLO-1</i>				√						CPMK-2/ <i>CLO-2</i>				√			√			CPMK-3/ <i>CLO-3</i>							√	√		CPMK-4/ <i>CLO-4</i>							√	√		CPMK-5/ <i>CLO-5</i>							√	√		CPMK-6/ <i>CLO-6</i>							√	√		CPMK-7/ <i>CLO-7</i>							√	√	
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Deskripsi Singkat MK/ <i>Course Description</i>	Mata kuliah ini bertujuan untuk membekali mahasiswa dengan kemampuan pemrograman untuk memformulasikan penyelesaian masalah statistika menggunakan dasar-dasar algoritma dan komputasi. Mata kuliah ini menitikberatkan pada peranan komputasi sebagai alat fundamental dalam analisis data, statistika inferensia, dan pemahaman teori dan metode statistika. Materi disampaikan melalui ceramah interaktif, diskusi, latihan, praktikum serta Problem Based Learning. Tools utama dalam mata kuliah ini yaitu R dan																																																																																

	Python. <i>This course aims to equip students with R and Python programming skills and then formulate problem solving using the basics of computational algorithms for statistical methods. This course focuses on the role of computing as a fundamental tool in data analysis, statistical inference, and for the development of statistical theories and methods. The material is delivered through interactive lectures, discussions, exercises, practicums and Problem Based Learning (PBL).</i>						
Bahan Kajian: Materi Pembelajaran/ Course Material	Dasar Sains, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, Pemodelan, Industri dan Bisnis, Pemerintahan dan Kependudukan, Ekonomi dan Manajemen, Kesehatan dan Lingkungan <i>Basic Science, Statistical Theory, Data Collection, Description and Exploration, Computing and Data Processing, Modeling, Industry and Business, Government and Population, Economics and Management, Health and Environment</i>						
Pustaka/ References	Utama/Primary:						
	1. Rizzo, M. L. 2017. Statistical Computing with R. Chapman dan Hall/ CRC Computer Science dan Data Analysis. 2. Halswanter, T. 2022. An Introduction to Statistics with Python. Springer						
	Pendukung/Secondary :						
	1. Manly, B. F. J. 1997. Randomization, Bootstrap and Monte Carlo Method in Biology. London : Chapman and Hall. 2. Efron, B. and Tibshirani, R. J. 1993. An Introduction to the Bootstrap. Chapman and Hall, Inc.						
Dosen Pengampu/ Lecturers	Prof. Dr.rer.pol. Heri Kuswanto, M.Si; Dr. Irhamah; M.Si; Dr. Kartika Fithriasari; Adatul Mukarromah, M.Si; Shofi Andari, Ph.D; Dr. Achmad Choiruddin; Neni Alya Firdausanti, Ph.D; Novri Suhermi, M.Sc.; Muhamad Syukron, S.Stat, MAI; Rahmatin Nur Amalia, S.Stat., M.Si.; Dea Saraswati Pramaningrum, S.Stat., M.Stat.						
Matakuliah syarat/ Pre-requisite Course	Pengantar Metode Statistika, Pemrograman Komputer <i>Introduction to Statistical Methods, Computer Programming</i>						
Mg Ke- Week	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) <i>Final capability for each learning step</i>	Penilaian <i>Evaluation</i>		Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu] <i>Learning Format Learning Methods Assignment for Student [Estimated Time]</i>		Materi Pembelajaran [Pustaka] <i>Learning Material [References]</i>	Bobot Penilaian (%) <i>Evaluation Weight (%)</i>
		Indikator <i>Indicator</i>	Kriteria & Bentuk <i>Criteria</i>	Luring <i>Offline</i>	Daring <i>Online</i>		

			<i>and Format</i>				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1-2	Mampu menjelaskan struktur pemrograman R <i>Able to explain the structure of R programming</i>	1.1 Mampu membaca data dari berbagai tipe file 1.2 Dapat menjelaskan struktur pemrograman R <i>1.1 Able to read data from various file types</i> <i>1.2 Can explain the programming structure of R</i>	Tugas, Observasi di kelas <i>Task, Observation in class</i>	Ceramah Interaktif, Diskusi, Latihan Soal Praktikum <i>Interactive Lectures, Discussions, Exercises Practice</i> TM: 2x3x50" PT: 2x3x60" BM: 2x3x60" P: 2x1x170"		Pengantar Pemrograman R: - Menjalankan R - Struktur data R - Membaca data - Manajemen data - Function di R (termasuk built-in function) - Conditional statement dalam R - Looping <i>Introduction to R Programming</i> - Running R and Python - R data structure - Read data - Data management - Functions in R (including built-in functions) - Conditional statements - Looping	5%/5%
3-4	Mampu menjelaskan dasar-dasar algoritma program statistika deskriptif dan mengimplementasikannya dalam program paket Statistika <i>Able to explain the basics of descriptive statistics program algorithms and implement them in the Statistics package program</i>	Mampu membuat program untuk komputasi statistika deskriptif menggunakan program R <i>Able to create programs for descriptive statistical computing using R programs</i>	Tugas, Observasi di kelas Tes Presentasi Makalah <i>Task, Observation in class Test Presentation Paper</i>	Ceramah Interaktif, Diskusi, PBL Praktikum <i>Interactive Lectures, Discussions, PBL Practice</i> TM: 2x3x50" PT: 2x3x60" BM: 2x3x60" P: 2x1x170"		Komputasi Statistika Deskriptif menggunakan R, antara lain: - kovarian/ korelasi - determinan - Grafik <i>Descriptive Statistical Computing using R:</i> - Covariance / correlation - Determinants - Graphics	20%/25%
5-7	Mampu menjelaskan dasar-	Mampu membuat program untuk komputasi pendugaan dan	Tugas, Observasi di	Ceramah Interaktif, Diskusi,		Komputasi Pendugaan dan Pengujian Parameter Satu,	25%/50%

	dasar algoritma program komputasi pendugaan parameter satu, dua dan k populasi serta mengimplementasi kannya dalam program paket Statistika <i>Able to explain the basics of computational program algorithms estimating one, two and k populations parameters as well as implementing them in the Statistics package program</i>	pengujian parameter satu, dua dan k populasi menggunakan R <i>Able to create programs for computational analysis of linear and non linier regression as well as diagnostic checking using R</i>	kelas Tes Presentasi Makalah <i>Task, Observation in class Test Presentation Paper</i>	PBL Praktikum <i>Interactive Lectures, Discussions, PBL Practice</i> TM: 2x3x50" PT: 2x3x60" BM: 2x3x60" P: 2x1x170"		Dua dan k Populasi menggunakan R - Stat uji - P-value (termasuk menghitung peluang menggunakan metode numerik) - Selang kepercayaan <i>Computational Estimation and Testing of Parameters One, Two and k Populations using R</i>	
8	ETS/Midterm						
9	Mampu menjelaskan struktur pemrograman Python <i>Able to explain the structure of Python language programming</i>	1.3 Mampu membaca data dari berbagai tipe file 1.4 Dapat menjelaskan struktur pemrograman python <i>1.3 Able to read data from various file types</i> <i>1.4 Can explain the programming structure of python</i>	Tugas, Observasi di kelas <i>Task, Observation in class</i>	Ceramah Interaktif, Diskusi, Latihan Soal Praktikum <i>Interactive Lectures, Discussions, Exercises Practice</i> TM: 1x3x50" PT: 1x3x60" BM: 1x3x60" P: 1x1x170"		Pengantar Pemrograman python: - Menjalankan python - Struktur data di python - Membaca data - Manajemen data - Conditional statement - Looping - Function (termasuk built-in function) <i>Introduction to python Programming</i> - Running Python - data structure in python - Reading data - Data management - Conditional statements - Looping - Functions	5%/55%
10 – 11	Mampu menjelaskan dasar algoritma program komputasi analisis regresi linier (sederhana dan berganda) serta pengujian hipotesis	Mampu membuat program untuk komputasi analisis regresi (linear sederhana dan berganda) serta pengujian hipotesis parameter regresi menggunakan Python <i>Able to make programs for computing</i>	Tugas, Observasi di kelas Tes Presentasi Makalah	Ceramah Interaktif, PBL Praktikum <i>Interactive Lectures, Discussions,</i>		Komputasi analisis regresi linear sederhana dan berganda menggunakan Python <i>Computation of simple and</i>	15%/70%

	parameter regresi dan mengimplementasikannya dalam program paket Statistika <i>Able to explain the basic algorithms of simple and multiple linear regression analysis computing programs as well as regression parameter hypothesis testing and implement them in the Statistics package program</i>	<i>simple and multiple linear regression analysis computing programs as well as regression parameter hypothesis testing using Python</i>	<i>Task, Observation in class Test Presentation Paper</i>	<i>PBL Practice</i> TM: 2x3x50" PT: 2x3x60" BM: 2x3x60" P: 2x1x170"		<i>multiple linear regression analysis using Python</i>	
12-13	Mampu memahami dasar algoritma program untuk komputasi regresi bootstrap dan jackknife berbasis pengamatan dan residual serta mengimplementasikannya dalam program paket Statistika <i>Able to understand the basic algorithms of programs for bootstrap and jackknife regression computing and implement them in the Statistics package program</i>	Mampu membuat program untuk komputasi regresi bootstrap dan jackknife berbasis pengamatan dan residual menggunakan Python <i>Able to write programs for bootstrap and jackknife regression computing using R and python</i>	Tugas, Observasi di kelas Tes <i>Task, Observation in class Test Presentation Paper</i>	Ceramah Interaktif, PBL Praktikum <i>Interactive Lectures, Discussions, PBL Practice</i> TM: 2x3x50" PT: 2x3x60" BM: 2x3x60" P: 2x1x170"		Komputasi Regresi bootstrap dan jackknife: - Berbasis pengamatan - Berbasis residual menggunakan Python <i>Regression computation bootstrap and jackknife:</i> - <i>Observation based</i> - <i>Residual based using python</i>	20%/90%
14-15	Mampu memahami dasar algoritma pembangkitan bilangan acak dan mengimplementasikannya dalam program paket Statistika <i>Able to understand the basis of random number generation algorithms and implement them in the</i>	a. Mampu menjelaskan algoritma pembangkitan bilangan acak dan mengimplementasikannya dalam program Python b. Mampu membedakan antara metode <i>Inverse</i> dan <i>Acceptance-Rejection</i> a. <i>Able to explain random number generation algorithm and implement it in python programs</i> b. <i>Able to distinguish between Inverse and Acceptance-</i>	Tugas, Observasi di kelas Tes Presentasi Makalah <i>Task, Observation in class</i>	Ceramah Interaktif, PBL Praktikum <i>Interactive Lectures, Discussions, PBL Practice</i> TM: 2x3x50"		Pembangkitan bilangan acak - Metode Invers - Metode Acceptance Rejection menggunakan python <i>Random number Generation</i> - <i>Inverse Method</i> - <i>Acceptance method</i>	10%/100%

	<i>Statistics package program</i>	<i>Rejection methods</i>	<i>Test Presentation Paper</i>	PT: 2x3x60" BM: 2x3x60" P: 2x1x170"		<i>Rejection using python</i>	
16	EAS/ <i>Final Exam</i>						