



INSTITUT TEKNOLOGI SEPULUH NOPEMBER
FAKULTAS SAINS DAN ANALITIKA DATA
PROGRAM STUDI DOKTOR ILMU STATISTIK
DEPARTEMEN STATISTIKA

Kode Dokumen

Rev 1

RENCANA PEMBELAJARAN SEMESTER

MATA KULIAH (MK)		KODE	Rumpun MK	BOBOT (sks)		SEMESTER	Tgl Penyusunan
Komputasi Statistika Intensif Lanjut		SS256211	Statistika Komputasi dan Sains Data	T=3	P=0	II	Agustus 2026
OTORISASI		Pengembang RPS		Koordinator RMK		Kepala PRODI	
				Prof. Drs. Nur Iriawan, M.lkomp, Ph.D		Irhamah, S.Si, M.Si, Ph.D.	
Capaian Pembelajaran (CP) <i>Learning Outcome (LO)</i>	CPL-PRODI yang dibebankan pada MK						
	CPL-6 <i>PLO-6</i>	Mampu merancang dan mengevaluasi sistem komputasi statistik canggih atau algoritma baru untuk pemrosesan data besar, serta mengkaji keefektifannya dibanding pendekatan konvensional. <i>Able to design and evaluate advanced statistical computing systems or novel algorithms for big-data processing, and assess their effectiveness relative to conventional approaches.</i>					
	CPL-7 <i>PLO-7</i>	Mampu menciptakan dan memvalidasi teknik komputasi statistik inovatif serta mengkritisi kekuatan dan kelemahannya dalam konteks data riil yang kompleks. <i>Able to create and validate innovative statistical-computing techniques and critically appraise their strengths and limitations in complex real-world data contexts.</i>					
	CPL-8 <i>PLO-8</i>	Mampu mengembangkan metode statistika atau model teoritis baru, serta mengevaluasi kontribusinya terhadap pengembangan ilmu statistik dan aplikasinya dengan pendekatan interdisipliner <i>Able to develop new statistical methods or theoretical models and evaluate their contribution to the advancement of statistics and its applications through an interdisciplinary approach.</i>					
Capaian Pembelajaran Mata Kuliah (CPMK)							
	CPMK-1 CLO-1	Mampu merancang dan mengembangkan algoritma komputasi untuk menentukan konstanta normalisasi dan parameter distribusi diskrit maupun kontinu, serta memvalidasi akurasi algoritma menggunakan R atau Python. <i>Able to design and develop computational algorithms for determining normalization constants and parameters of discrete and continuous distributions, and validate the accuracy of the algorithms using R or Python.</i>					
	CPMK-2 CLO-2	Mampu menganalisis karakteristik distribusi/model unimodal dan multimodal serta mengembangkan algoritma estimasi parameter untuk model <i>closed-form</i> maupun <i>non-closed-form</i> , dan mengevaluasi kinerjanya menggunakan R atau Python. <i>Able to analyze the characteristics of unimodal and multimodal distributions/models, develop parameter estimation algorithms for closed-form and non-closed-form models, and evaluate their performance using R or Python.</i>					

	<i>and methods and develop them as add-in facilities or new libraries in statistical software such as R, Python, MATLAB, or WinBUGS. Through literature studies, students explore the development of inferential statistical methods and computational approaches, particularly those relevant to their research and dissertation. The learning strategies used are interactive lectures, problem-based learning, discussions, exercises, literature studies, assignments, observations, presentations, and paper writing.</i>
Bahan Kajian: Materi Pembelajaran	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>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	<p>Utama :</p> <ol style="list-style-type: none"> 1. Efron, B. And Tibshirani, R. J. (1993) An Introduction to the Bootstrap. Chapman and Hall, Inc. 1993. 2. Eubank, R.L. and Kupresanin, A. (2011) Statistical Computing in C++ and R, Chapman & Hall/CRC The R Series, USA. 3. Gentle, J. E. (2009) Computational Statistics (Statistics and Computing), Springer. 4. Marques de Sá, J. P.(2007) Applied Statistics Using SPSS, STATISTICA, MATLAB and R. Springer-Verlag, Berlin Heidelberg. 5. Martinez, W.L. and Martinez, A.R. (2007) Computational Statistics Handbook with MATLAB, Second Edition, Chapman & Hall/CRC Computer Science & Data Analysis, USA. 6. Mantovan, P. and Secchi, P. (2010) Complex Data Modeling and Computationally Intensive Statistical Methods (Contributions to Statistics), Springer. 7. Muenchen, R. A. (2009) R for SAS and SPSS Users. Springer. New York, USA. 8. Ntzoufras, I. (2009) Bayesian Modeling Using WinBUGS, Wiley Series in Computational Statistics, Wiley. 9. Rizzo, M.L. (2007) Statistical Computing with R, Chapman & Hall/CRC The R Series, USA. 10. Jurnal-jurnal internasional yang membahas tentang Computationally Intensive Statistical Methods. <p>Pendukung :</p>
Dosen Pengampu	
Matakuliah syarat	

Mg Ke-	Kemampuan akhir tiap tahapan belajar (Sub-CPMK)	Penilaian		Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]		Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
		Indikator	Kriteria & Bentuk	Luring (offline)	Daring (online)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1-3	Mampu merancang	Mampu menjelaskan		1. Ceramah interaktif		Studi literatur	15%/15%

Mg Ke-	Kemampuan akhir tiap tahapan belajar (Sub-CPMK)	Penilaian		Bentuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]		Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
		Indikator	Kriteria & Bentuk	Luring (offline)	Daring (online)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<p>dan membuat program/ perangkat lunak statistika untuk Statistika Inferensia (estimasi dan pemodelan Statistika) yang belum tersedia di program paket komersil, serta membuat perangkat lunak statistika tersebut sebagai fasilitas adds-in di program paket statistika, seperti menjadi library baru di R, Python, MATLAB atau WinBUGS.</p> <p><i>ble to design and create statistical programs/software for Inferential Statistics (Statistical estimation and modeling) that are not yet available in commercial package programs, as well as making the</i></p>	<p>teori dan metode Statistika Inferensia serta program yang telah tersedia dalam perangkat lunak statistika</p> <p><i>Able to explain the theory and methods of Inferential Statistics and the programs that are available in statistical software</i></p>		<p>2. PBL 3. Diskusi 4. Latihan</p> <p><i>1.Interactive lecture 2.PBL 3.discussion 4.exercise</i></p>		<p>tentang perkembangan teori dan metode statistika inferensia beserta feature yang telah tersedia di perangkat lunak statistika, utamanya terkait disertasi mahasiswa</p> <p><i>Literature study on the development of inferential statistical theory and methods along with the features available in statistical software, mainly related to student dissertations</i></p>	
4-8		<p>Mampu menjelaskan teori dan metode Statistika Inferensia serta program yang belum tersedia dalam perangkat lunak statistika komersil</p>	<ul style="list-style-type: none"> - Tugas - Observasi di kelas - Presentasi dan makalah - Task - Observation in 	<p>1. Ceramah interaktif 2. PBL 3. Diskusi 4. Latihan</p> <p><i>1.Interactive lecture 2.PBL</i></p>		<p>Studi perkembangan teori dan metode statistika terbaru yang penyelesaiannya belum tersedia di program paket</p>	25%/40%

Mg Ke-	Kemampuan akhir tiap tahapan belajar (Sub-CPMK)	Penilaian		Bantuan Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]		Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
		Indikator	Kriteria & Bentuk	Luring (offline)	Daring (online)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>statistical software as an add-in facility in statistical package programs, such as being a new library in R, Python, MATLAB or WinBUGS.</i>	<i>Able to explain theories and methods of Inferential Statistics and programs that are not yet available in commercial statistical software</i>	<i>class</i> <i>- Presentations and papers</i>	<i>3.discussion</i> <i>4.exercise</i>		komersil <i>The study of the development of the latest statistical theories and methods whose completion is not yet available in commercial package programs</i> 1.	
9-16		1.Mampu merancang dan membuat program/perangkat lunak statistika untuk Statistika Inferensia yang belum tersedia di program paket komersil 2.membuat perangkat lunak statistika tersebut sebagai fasilitas adds-in di program paket statistika <i>1. Able to design and create statistical programs/software for Inferential</i>	- Tugas - Observasi di kelas - Presentasi dan makalah <i>- Task</i> <i>- Observation in class</i> <i>- Presentations and papers</i>	1. Ceramah interaktif 2. PBL 3. Diskusi 4. Latihan <i>1.Interactive lecture</i> <i>2.PBL</i> <i>3.discussion</i> <i>4.exercise</i>		Implementasi algoritma komputasi untuk penyelesaian teori dan metode statistika terbaru yang belum tersedia di program paket statistika komersil. <i>Implementation of computational algorithms for solving the latest statistical theories and methods that are not yet available in commercial</i>	60%/100%

Mg Ke-	Kemampuan akhir tiap tahapan belajar (Sub-CPMK)	Penilaian		Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]		Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
		Indikator	Kriteria & Bentuk	Luring (<i>offline</i>)	Daring (<i>online</i>)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		<i>Statistics that are not yet available in commercial packages</i> 2. make the statistical software as an add-in facility in the statistics package program				<i>statistical packages.</i>	