



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

Kode Dokumen
REV-1

RENCANA PEMBELAJARAN SEMESTER

MATA KULIAH (MK)		KODE	Rumpun MK	BOBOT (sks)		SEMESTER	Tgl Penyusunan
Model Linier		SS255103	Analitika Data Ekonomi dan Finansial	T=3	P=0	I	Agustus 2026
OTORISASI		Pengembang RPS		Koordinator RMK		Kepala PRODI	
		Dr. Setiawan, MS		Dr. Setiawan, MS		Irhamah, S.Si, M.Si, Ph.D.	
Capaian Pembelajaran (CP) <i>Learning Outcome (LO)</i>	CPL-PRODI yang dibebankan pada MK						
	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-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)						
	CPMK-1	Mampu memperdalam konsep matriks dan vector <i>Able to deepen the concepts of matrices and vectors.</i>					
	CPMK-2	Mampu menjelaskan konsep matriks dan vektor random dalam distribusi multivariate normal, distribusi bentuk kuadratik dan kenonsentralannya <i>Able to explain the concepts of random matrices and vectors in multivariate normal distributions, quadratic forms, and noncentrality</i>					
	CPMK-3	Mampu menjelaskan konsep estimasi dan pengujian parameter pada regresi linear <i>Able to explain the concepts of parameter estimation and testing in linear regression.</i>					
	CPMK-4	Mampu menjelaskan konsep model searah dan dwi arah, estimasi parameter, dan pengujian hipotesis <i>Able to explain the concepts of one-way and two-way models, parameter estimation, and hypothesis testing.</i>					
	CPMK-5	Mampu menjelaskan konsep model searah dan dwi arah untuk kasus data balans <i>Able to explain the concepts of one-way and two-way models for balanced data cases.</i>					

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Deskripsi Singkat MK	Model Linier merupakan salah satu mata kuliah keahlian yang merupakan bagian dari bidang kajian dalam rumpun mata kuliah Pemodelan statistik. Tujuan mempelajari Model Linier adalah untuk menguasai konsep teori pemodelan linier untuk memahami model linier univariat dan multivariat, baik dalam pengembangan dan penerapannya. Melalui mata kuliah ini diharapkan mahasiswa akan memiliki pengalaman belajar untuk berfikir secara kritis dan mampu memberikan keputusan yang tepat tentang pemodelan linier pada suatu permasalahan dan penyelesaiannya. Strategi pembelajaran yang digunakan adalah diskusi dan latihan serta tugas. <i>LINEAR MODEL is one course of competence as part of field of study in Statistical modeling course cluster . The purpose of learning Linear Model is to manage concept of linear model theory to understand untuk memahami univariate and multivariate linear models, both in its development and its application. By this course, students are expected to have learning experience to think critically and are able to give an accurate decision about linear model on a problem and its solution. Discussions and practises as well as assignments are used as learning strategy.</i>																																																																																																																								
Bahan Kajian: Materi Pembelajaran	Matematika, 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>Mathematics, 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>																																																																																																																								
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Matakuliah syarat	
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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)
1-2	1. Pendahuluan: memperdalam konsep matriks dan vektor <i>Introduction: deepen the concept of matrices and vectors</i>	1.1. Mampu menjelaskan dan memberi contoh tentang bermacam-macam matriks khusus, dan vector dengan sifat-sifat operasionalna. 1.2. Mampu menyajikan statistik ke dalam bentuk matriks dan vektor. 1.3. Mampu melakukan perhitungan determinan, trace, rank, inverse, g-inverse, suatu matriks. 1.4. Mampu menghitung dan menjelaskan nilai dan vector eigen suatu matriks serta memperoleh matriks orthogonal (pendiagonal). 1.5. Mampu memberikan turunan suatu matrks. <i>1.1 Able to explain and give examples of various special matrices, and vectors with operational properties.</i> <i>1.2 Able to present statistics to the form of matrices and vectors.</i> <i>Able to calculate determinant, trace, rank, inverse, g-inverse, a matrix.</i> <i>1.3 Able to calculate and explain values and eigenvectors of a matrix and obtain orthogonal (diagonal) matrices.</i> <i>1.4 Able to give the derivative of a matrix.</i>	Tes tulis Tugas 1 Observasi di kelas <i>writing test Task 1 Observation in class</i>	Ceramah, Diskusi,dan Latihan soal. 300 Menit <i>Lectures, Discussions, and Exercises. 300 Minutes</i>		MENGULANG: Memperdalam konsep matriks dan vektor <i>REPEAT: Deepen the concepts of matrices and vectors</i>	15%/15%

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)
3-5	2. Mampu menjelaskan konsep matriks dan vektor random dalam distribusi multivariate normal, distribusi bentuk kuadratik dan kenon-sentralannya. 2. <i>Able to explain the concept of matrices and random vectors in normal multivariate distributions, distributions of quadratic form and its non-centralization.</i>	2.1 Mampu mendefinisikan dan menjelaskan variabel random dalam bentuk vektor. 2.2 Mampu menjelaskan distribusi multivariate normal dalam bentuk matriks. 2.3 Mampu menerangkan, memberi contoh, sifat dan aksioma bentuk kuadratik dan distribusinya. 2.4 Mampu menjelaskan kenon-sentralannya kaitannya dengan pengujian hipotesis. <i>2.1 Able to define and explain random variables in vector form.</i> <i>2.2 Able to explain the normal multivariate distribution in the form of a matrix.</i> <i>2.3 Able to explain, give examples, properties and axioms of quadratic forms and their distributions.</i> <i>2.4 Able to explain non-centralization in relation to hypothesis testing.</i>	Testulis Tugas 2 Observasi di kelas <i>Writing test</i> <i>Task 2</i> <i>Observation in class</i>	Ceramah, Diskusi, dan Latihan soal. 450 Menit <i>Lectures, Discussions, and Exercises.</i> <i>450 Minutes</i>		BENTUK KUADRATIK: Matriks dan vektor random. Distribusi multivariate normal. Distribusi bentuk kuadratik dan kenon-sentralannya. <i>QUADRATIC FORM: Random matrices and vectors. Normal multivariate distribution.</i> 1. <i>The distribution of quadratic form and its non-centralization.</i>	20%/35%

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)
6-8	3. Mampu menjelaskan pengertian estimasi parameter regresi linier ganda. <i>3. Able to explain the meaning of multiple linear regression parameter estimation.</i>	3.1Dapat memperoleh estimasi dan pengujian hipotesis dalam bentuk umum dari parameter regresi linier ganda. 3.2Mampu menjelaskan hasil pengujian parameter. 3.3Mampu melakukan cek dan validasi model untuk variabel predictor yang random. <i>3.1 Able to obtain estimates and hypothesis testing in the general form of multiple linear regression parameters.</i> <i>3.2 Able to explain the results of parameter testing.</i> <i>3.3 Able to check and validate the model for random predictor variables.</i>	Testulis Tugas3 Observasi di kelas <i>Writing test Task 3 Observation in class</i>	Ceramah, Diskusi,dan Latihan soal. 450 Menit <i>Lectures, Discussions, and Exercises. 450 Minutes</i>		REGRESI LINIER GANDA : Estimasi, Pengujian hipotesis, dengan hipotesis linier dalam bentuk umum, dan selang kepercayaan. Catatan: Ada ETS. <i>MULTIPLE LINEAR REGRESSION: Estimation, Hypothesis testing, with linear hypotheses in general form, and confidence intervals. Note: There is an ETS.</i>	15%/50%
9-11	4.Mampu menjelaskan konsep model searah dan dwi arah, estimasi parameter, dan	4.1 Mampu menjelaskan model searah dan dwi arah yang tidak ber-rank penuh. 4.2 Mampu melaksanakan estimasi kontras dan varians, reparameterisasi. 4.3 Mampu menjelaskan hipotesis linier umum. <i>4.1 Able to explain one-way and two-way models that are not fully ranked.</i>	Testulis Tugas4 Observasi di kelas <i>Writing test Task4</i>	Ceramah, Diskusi,dan Latihan soal. 450 Menit <i>Lectures, Discussions, and</i>		ANOVA: Model searah dan dwi arah baik untuk yang ber-rank penuh ataupun tidak.	20%/70%

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)
	pengujian hipotesis. <i>Able to explain the concept of unidirectional and bidirectional models, parameter estimation, and hypothesis testing.</i>	<i>4.2 Able to carry out the estimation of contrast and variance, repameterization.</i> <i>4.3 Able to explain general linear hypothesis.</i>	<i>Observation in class</i>	<i>Exercises. 450 Minutes</i>		Estimasi parameter model, pengujian hipotesis termasuk ilustrasinya. <i>ANOVA:</i> <i>One-way and two-way models are good for full-ranked or not. Estimation of model parameters, hypothesis testing including illustrations.</i>	
12-13	5.Mampu menjelaskan konsep model searah dan dwiarah untuk kasus data balans. <i>Able to explain the concept of one-</i>	5.1 Mampu menjelaskan fungsi ter-estimasi, dan mampu menyelesaikan persamaan normalnya. 5.2 Mampu melakukan pengujian hipotesis, lewat pendekatan model penuh dan tereduksi. 5.3 Mampu mendapatkan nilai harapan mean kuadrat, lewat pendekatan model penuh dan tereduksi. 5.4 Mampu melakukan pengujian hipotesis suatu kontras.	Testulis Tugas 5 Observasi di kelas <i>Writing test Task 5 Observation in class</i>	Ceramah, Diskusi,dan Latihan soal. 300 Menit <i>Lectures, Discussions, and Exercises. 300 Minutes</i>		Searah dan Dwiarah untuk kasus data balans, <i>One-way and two-way for data balance cases,</i>	10%/80%

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)
	<i>way and two-way models for balanced data cases.</i>						
14	6. Mampu menjelaskan konsep Anova untuk kasus data yang tidak balans, model mean sel.	6.1 Mampu menjelaskan model searah dan dwi arah yang tidak ber-rank penuh untuk model mean sel. 6.2 Mampu melaksanakan estimasi kontras model mean sel baik berkendala ataupun tidak. <i>5.1 Able to explain estimated functions, and able to solve normal equations.</i> <i>5.2 Able to perform hypothesis testing, through a full and reduced model approach.</i> <i>5.3 Able to get the expected value of the mean squared, through the full and reduced model approach.</i> <i>5.4 Able to test the hypothesis of a contrast.</i> <i>6.1 Be able to explain one-way and two-way models that are not fully ranked for the cell mean model.</i> <i>6.2 Able to carry out the estimation of the contrast of the cell mean model, whether it is constrained or not.</i>	Testulis Tugas6 Observasi di kelas	Ceramah, Diskusi, dan Latihan soal. 150 Menit <i>Lectures, Discussions, and Exercises.</i> <i>150 Minutes</i>		Anova untuk kasus data yang tidak balans, model mean sel.	10%/90%
15-16	7. Mampu menjelaskan konsep	7.1 Mampu menjelaskan model ANACOVA, melakukan estimasi dan pengujian hipotesis.	Testulis Tugas7 Observasi di	Ceramah, Diskusi, dan Latihan soal.		ANACOVA dan MODEL CAMPURAN:	10%/100%

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 (<i>offline</i>)	Daring (<i>online</i>)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ANACOVA dan MODEL CAMPURAN <i>7. Able to explain the concept of ANACOVA and MIXED MODEL</i>	7.2 Mampu menjelaskan model linier CAMPURAN, melakukan estimasi komponen varians dan memberikan analisis terhadap baik unsur fix maupun unsur random. <i>7.1 Able to explain the ANACOVA model, estimate and test hypotheses. 7.2 Able to explain MIXED linear models, estimate variance components and provide analysis of both fixed and random elements.</i>	kelas <i>Writing test Task 7 Observation in class</i>	300 Menit <i>Lectures, Discussions, and Exercises. 300 Minutes</i>		Catatan : Ada EAS. <i>ANACOVA and MIXED MODELS: Note: There is EAS.</i>	