



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
Analisis Survival		SS255352	Statistika Dan Sains Data Lingkungan Dan Kesehatan	T=3	P=0	III	Agustus 2026
OTORISASI		Pengembang RPS		Koordinator RMK		Kepala PRODI	
		Dr. Santi Wulan Purnami, S.Si., M.Si.		Prof. Dr. Bambang Widjanarko Otok, S.Si, M.Si		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-6 <i>PLO-6</i>	Mampu mengintegrasikan perangkat komputasi modern untuk mengembangkan solusi statistik yang efisien, dengan mengevaluasi keandalan dan ketepatan hasil komputasi. <i>Able to integrate modern computing tools to develop efficient statistical solutions, while assessing the reliability and accuracy of computational results.</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>					
	CPL-9 <i>PLO-9</i>	Mampu menganalisis dan mengevaluasi metode statistika berbasis komputasi atau analitik yang inovatif untuk mengatasi permasalahan riil di bidang bisnis, industri, ekonomi, finansial, sosial dan pembangunan berkelanjutan, lingkungan, kesehatan, serta mengevaluasi dampaknya terhadap pengambilan keputusan <i>Able to analyze and evaluate innovative computation- or analytics-based statistical methods to address real-world problems in business, industry, economics and finance, social and sustainable development, environment, and health, and to assess their impact on decision-making.</i>					
	Capaian Pembelajaran Mata Kuliah (CPMK)						
	CPMK-1	Mampu menganalisis dan mengintegrasikan Teori Statistika dalam merumuskan metode survival yang inovatif untuk menyelesaikan permasalahan teoritis dan riil. <i>Able to analyze and integrate statistical theory in formulating innovative survival methods to solve theoretical and real problems.</i>					

Pembelajaran		
Pustaka	Utama :	
	1.	David G. Kleinbaum, Mitchel Klein, Survival Analysis, third edition, Springer Science+Business Media, LLC, 2012
	2.	David W. Hosmer, Stanley Lemeshow, May, S., Applied Survival Analysis, John Wiley & Sons, Inc., Hoboken, New Jersey, 2008
	3.	David Collet, Modelling Survival Data in Medical Research, Third Edition, Chapman and Hall/CRC, 2014
	4.	Cox, D.R., Oakes, D., Analysis of Survival Data, University Printing House, Cambridge, 1984
	5.	Le, C. T., Applied Survival Analysis, John Wiley & Sons, Inc., 1997
	6.	Kalbfleish, J. and Prentice, R.L., 2002, The Statistical Analysis of Failure Time Data, John Wiley & Sons.
	7.	Klein, J. P. and Moeschberger, M., 2003, Survival Analysis Techniques for Censored and Truncated Data, 2nd Ed., Springer-Verlag.
	8.	Allisson, P.D, 2010, Survival Analysis using SAS: A Practical Guide, 2nd, SAS Institute Inc.
	9.	Cantor, A.B., 2003, SAS Survival Analysis Techniques for Medical Research, 2nd, SAS Institute Inc.
	10.	Omurlu, I., Ozdamar, K., & Ture, M. (2009). Comparison of Bayesian survival analysis and Cox Regression Analysis in simulated and breast cancer data sets. 36, 11341–11346.
	Pendukung :	
Dosen Pengampu	Santi Wulan Purnami, S.Si, M.Si, Ph.D; Jerry Dwi Trijoyo Purnomo, S.Si, M.Si, Ph.D; Dr. rer pol. Dedy Dwi Prastyo, S.Si, M.Si	
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	1. Dapat menjelaskan konsep dan tujuan analisis survival <i>Able to explain the concept and purpose of survival analysis</i>	1.1 Dapat menjelaskan konsep analisis survival 1.2 Dapat menjelaskan tujuan analisis survival 1.3 Dapat menjelaskan censored data <i>1.1 Able to explain the concept of survival analysis</i>	Observasi Aktifitas di kelas <i>Observation Activities in class</i>	Ceramah interaktif Diskusi (CID) 150 Menit <i>Interactive Lectures Discussion (ILD) 150 Minutes</i>		Pengantar analisis survival: konsep dasar analisis survival, censored data <i>Introduction to survival analysis: the basic</i>	10%/10%

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 Able to explain the purpose of survival analysis Able to explain the censored data				concepts of survival analysis, censored data	
2	2. Dapat menghitung estimasi dan membuat grafik fungsi survival menggunakan metode parametrik dan Kaplan Meier Able to calculate the estimation and graph of survival functions using parametric methods and Kaplan Meier	4.1 Dapat menghitung probabilitas survival 4.2 Dapat membuat kurva Kaplan Meier (KM) 4.3 Dapat mengidentifikasi bentuk model survival (parametrik) 2.1 Able to calculate the survival probability 2.2 Able to make Kaplan Meier curve (KM) Able to identify the form of survival model (parametric)	Tugas 1 (Observasi Aktivitas di kelas Assignment 1 (Observation Activities in class)	Ceramah interaktif Diskusi Latihan soal (CIDL) 150 Menit Interactive lectures Discussion Exercises (ILDE) 150 Minutes		Fungsi survival: fungsi survival (parametrik), kurva survival Kaplan Meier, hazard rate 1. Survival function: survival function (parametric), Kaplan Meier survival curve, hazard rate	10%/20%
3	3. Dapat melakukan pengujian perbedaan dua atau lebih kurva survival Able to test the difference of two or more survival	3.1Dapat melakukan uji LR untuk 2 group 3.2Dapat melakukan uji LR untuk beberapa group (lebih dari 2 group) 3.1 Able to perform LR tests for 2 groups Able to perform LR tests for multiple groups (more than 2	Tes & Observasi Aktivitas di kelas (TOA) Test & Observation of Activities in class (TOA)	Ceramah Interaktif-Diskusi - Praktikum-Latihan Soal-Observasi (CIPLSO) 150 Menit		The log rank (LR) test: LR test untuk 2 group dan lebih dari 2 group: The log rank (LR) test: LR test for 2 groups and more than 2 groups:	5%/25%

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>curves</i>	<i>groups)</i>		<i>Interactive Lectures- Discussions - Practicum- Exercise- Observation (ILDPEO) 150Minutes</i>			
4, 5	4. Dapat mengidentifikasi dan melakukan estimasi parameter regresi survival untuk data lengkap maupun tersensor <i>Able to identify and perform parameters estimation of survival regression for complete or censored data</i>	4.1 Dapat mengidentifikasi regresi yang sesuai (regresi eksponensial, weibull, loglogistik) 4.2 Dapat melakukan estimasi MLE dari parameter regres yang sesuai baik untuk data lengkap maupun tersensor 4.3 Dapat menganalisis model regresi 4.1 <i>Able to identify the appropriate regression (exponential regression, weibull, log logistic)</i> 4.2 <i>Able to perform the MLE estimation of appropriate regression parameters for both complete and censored data</i> 4.3 <i>Able to analyze regression models</i>	TOA Makalah 1 Presentasi 1 <i>TOA Paper 1 Presentation 1</i>	Ceramah Interaktif- Diskusi - Praktikum- Latihan Soal- Observasi (CIPLSO) 300 Menit <i>Interactive Lectures- Discussions - Practicum- Exercise- Observation (ILDPEO) 300 Minutes</i>		Regresi survival parametrik: Regresi Eksponensial, Weibull, Loglogistik <i>Parametric survival regression: Exponential regression, Weibull, Log logistics</i>	10%/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	5. Dapat mengidentifikasi dan merumuskan bentuk umum dari model Cox PH <i>Able to identify and formulate the common forms of the Cox PH model</i>	5.1 Dapat merumuskan bentuk spesifik dari model Cox PH yang sesuai 5.2 Dapat merumuskan bentuk dan sifat-sifat fungsi hazard model Cox PH 5.3 Dapat menginterpretasikan model Cox PH <i>5.1 Able to formulate a specific form of the appropriate Cox PH model</i> <i>5.2 Able to formulate the shape and properties of cox ph hazard model function</i> <i>Able to interpret the Cox PH model</i>	TOA Makalah 1 Presentasi 1 <i>TOA</i> <i>Paper 1</i> <i>Presentation 1</i>	CIPLSO 150 Menit <i>ILDPEO</i> <i>150 Minutes</i>		The Model Cox proportional Hazard (PH) model: Estimasi model cox PH, Hazard ratio model cox PH, interval estimation <i>The Model Cox proportional Hazard (PH) model:</i> <i>Cox PH model estimation, cox PH Hazard ratio model, interval estimation</i>	10%/45%
7	6. Dapat melakukan dan menganalisis uji asumsi dari model Cox PH dengan metode grafik dan uji goodness of fit (GOF) <i>Able to perform and analyze the</i>	6.1 Dapat melakukan uji asumsi model Cox PH dengan metode: - Grafik - Uji GOF 6.2 Dapat menganalisis dan menginterpretasikan hasil evaluasi asumsi	TOA Makalah 1 Presentasi 1 TOA Paper 1 Presentation 1	CIPLSO 150 Menit <i>ILDPEO</i> <i>150 Minutes</i>		Evaluasi asumsi proportional hazards: pendekatan grafik(log-log plots, nilai aktual dengan nilai prediksi) - pendekatan uji goodness of fit <i>Evaluation of proportional</i>	5%/50%

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>assumption tests of the Cox PH model with graphical methods and goodness of fit (GOF) tests</i>	6.1 <i>Able to test the assumptions of the Cox PH model by:</i> - Graphical method - GOF test 6.2 <i>Able to analyze and interpret the assumptions evaluation results</i>				<i>hazards assumptions: graphical approach (log-log plots, actual values with predictive values) - uji goodness of fit approach</i>	
8	ETS						
9	7. Dapat melakukan dan menganalisis model stratified cox regression <i>Able to perform and analyze the stratified cox regression models</i>	7.1 Dapat menjelaskan prosedur stratified Cox 7.2. Dapat menerapkan prosedur stratified Cox 7.3. Dapat menginterpretasikan stratified cox. <i>7.1 Able to describes the stratified Cox procedure</i> <i>7.2. Able to apply the stratified Cox procedures</i> <i>7.3. Able to interpret the stratified cox.</i>	TOA Makalah 2 Presentasi 2 <i>TOA Paper 2 Presentation 2</i>	CIPLSO 150 Menit <i>ILDPEO 150 Minutes</i>		Model Stratified Cox Regression <i>Stratified Cox Regression Model</i>	10%/60%
10,11	8. Dapat melakukan pemodelan menggunakan Extended Cox Model	8.1 Dapat melakukan pemodelan extended cox 8.2. Dapat menganalisis dan menginterpretasikan model cox extended	TOA Makalah 2 Presentasi 2 <i>TOA Paper 2 Presentation 2</i>	CIPLSO 300 Menit <i>ILDPEO 300 Minutes</i>		Extended Cox regression untuk variabel time dependent <i>Extended Cox regression for</i>	10%/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)
	<i>Able to perform modeling using Extended Cox Model</i>	8.1 <i>Able to perform extended cox model</i> <i>Able to analyze and interpret the extended cox model</i>				<i>time dependent variables</i>	
12,13	9. Dapat menjelaskan dan menganalisis data recurrent event <i>Able to explain and analyze the recurrent event data</i>	9.1 Dapat mengidentifikasi problem data recurrent event 9.2 Dapat menganalisis data recurrent event 9.1 <i>Able to identify the recurrent event data problems</i> <i>Able to analyze recurrent event data</i>	TOA TOA	CIPLSO 300 Menit <i>ILDPEO</i> <i>300 Minutes</i>		Analisis survival untuk data <i>recurrent event</i> <i>Survival analysis for recurrent event data</i>	10%/80%
14	10. Dapat menganalisis data menggunakan pendekatan <i>Competing Risk</i> <i>Able to analyze data using the Competing Risk approach</i>	10.1 Dapat mengidentifikasi problem data recurrent event 10.2 Dapat menganalisis data recurrent event 10.1 <i>Able to identify the recurrent event data problems</i> <i>Able to analyze recurrent event data</i>	TOA Makalah 3 Presentasi 2 Review Jurnal <i>TOA Paper 3 Presentation 2 Journal Review</i>	Ceramah interaktif Diskusi (CID) 150 Menit <i>Interactive lectures Discussion (ILD)</i> <i>150 Minutes</i>		Competing Risk survival analysis : Separate Models for Different Event Types, Cumulative Incidence Curves, Conditional Probability Curves <i>Competing Risk survival analysis:</i>	10%/90%

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>Separate Models for Different Event Types, Cumulative Incidence Curves, Conditional Probability Curves</i>	
15	11. Dapat menganalisis data survival menggunakan pendekatan Bayesian <i>Able to analyze survival data using Bayesian approach</i>	11.1 Dapat melakukan pemodelan data survival dengan pendekatan Bayesian <i>Able to perform the survival data modeling with bayesian approach</i>	TOA Makalah 3 Presentasi 2 Review Jurnal <i>TOA Paper 3 Presentation 2 Journal Review</i>	Ceramah interaktif Diskusi (CID) 150 Menit <i>Interactive lectures Discussion (ILD) 150 Minutes</i>		Analisis survival menggunakan bayesian <i>Survival analysis using bayesian</i>	10%/100%
15	EAS						