



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
Analisis Pengontrolan Proses Lanjut		SS256221	Analitika Data Bisnis dan Industri	T=3	P=0	II	Agustus 2026
OTORISASI		Pengembang RPS		Koordinator RMK		Kepala PRODI	
		Dr. Muhammad Ahsan, S.Si.		Dr. Muhammad Ahsan, S.Si.		Irhamah, S.Si, M.Si, Ph.D.	
Capaian Pembelajaran (CP) <i>Learning Outcome (LO)</i>	CPL-PRODI yang dibebankan pada MK						
	CPL-5 <i>PLO-5</i>	Mampu mengembangkan metodologi pengumpulan data terstruktur dan tidak terstruktur berbasis pengamatan, eksperimen, sampling, dan simulasi <i>Able to design and develop methodologies for collecting structured and unstructured data based on observation, experimentation, sampling, and simulation.</i>					
	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 menganalisis kerangka konseptual, metodologi, dan penerapan pengontrolan kualitas berbasis statistika serta mengevaluasi perkembangan metode pengontrolan kualitas untuk meningkatkan efektivitas pengendalian proses. <i>Able to analyze the conceptual framework, methodology, and application of statistical-based quality control, and evaluate the development of quality control methods to improve process control effectiveness.</i>					
	CPMK-2 CLO-2	Mampu menganalisis dan mengevaluasi metodologi pengontrolan kualitas multivariat dan berbasis model statistika serta mengembangkan metode atau diagram kontrol yang sesuai dengan karakteristik kualitas					

		dan data. <i>Able to analyze and evaluate multivariate and statistical model-based quality control methodologies and develop methods or control charts appropriate to the characteristics of quality and data.</i>																																																																						
	CPMK-3 CLO-3	Mampu menganalisis dan mengevaluasi metode pengontrolan kualitas berbasis transformasi fuzzy dan statistika robust serta mengembangkan pendekatan pengontrolan proses yang mampu mengakomodasi ketidakpastian dan karakteristik data. <i>Able to analyze and evaluate fuzzy transformation-based and robust statistics-based quality control methods and develop process control approaches that accommodate uncertainty and data characteristics.</i>																																																																						
	CPMK-4 CLO-4	Mampu menganalisis dan mengevaluasi metode pengontrolan kualitas berbasis statistika nonparametrik dan untuk <i>short production run</i>, serta mengembangkan pendekatan pengontrolan proses yang sesuai dengan karakteristik data dan kondisi produksi. <i>Able to analyze and evaluate nonparametric statistics-based quality control methods and quality control methods for short production runs, and develop process control approaches appropriate to data characteristics and production conditions.</i>																																																																						
	CPMK-5 CLO-5	Mampu mengevaluasi perkembangan <i>statistical process control</i> untuk <i>big data</i> serta mengembangkan inovasi metode pengontrolan kualitas yang sesuai dengan karakteristik dan kompleksitas data. <i>Able to evaluate the development of statistical process control for big data and develop innovative quality control methods appropriate to the characteristics and complexity of the data.</i>																																																																						
		<table><tr><th colspan="10">Matrik CPL – CPMK</th></tr><tr><th>CPMK</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</td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td><td>V</td><td></td></tr><tr><td>CPMK-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td><td>V</td><td></td></tr><tr><td>CPMK-3</td><td></td><td></td><td></td><td></td><td>V</td><td>V</td><td></td><td>V</td><td></td></tr><tr><td>CPMK-4</td><td></td><td></td><td></td><td></td><td>V</td><td>V</td><td></td><td>V</td><td></td></tr><tr><td>CPMK-5</td><td></td><td></td><td></td><td></td><td>V</td><td>V</td><td></td><td>V</td><td></td></tr></table>	Matrik CPL – CPMK										CPMK	CPL-1	CPL-2	CPL-3	CPL-4	CPL-5	CPL-6	CPL-7	CPL-8	CPL-9	CPMK-1							V	V		CPMK-2							V	V		CPMK-3					V	V		V		CPMK-4					V	V		V		CPMK-5					V	V		V	
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Deskripsi Singkat MK	Analisis Pengontrolan Proses Lanjut merupakan mata kuliah keahlian dalam bidang Analitika Data Bisnis dan Industri yang membahas pengembangan dan penerapan metode statistika untuk pengontrolan dan peningkatan kualitas proses. Mata kuliah ini mencakup analisis pengontrolan kualitas berbasis statistika, pengontrolan multivariat dan berbasis model statistika, transformasi fuzzy, statistika robust dan nonparametrik, <i>short production run</i>, serta <i>statistical process control</i> untuk <i>big data</i>. Mahasiswa diarahkan untuk menganalisis dan mengevaluasi perkembangan metode pengontrolan kualitas serta mengembangkan pendekatan atau inovasi metode yang sesuai dengan karakteristik dan kompleksitas data serta permasalahan proses. Pembelajaran dilakukan melalui studi literatur, kajian artikel ilmiah, penugasan, presentasi, dan diskusi. <i>Advanced Process Control Analysis is an expertise course in the field of Business and Industrial Data Analytics that covers the development and application of statistical methods for process quality control and improvement. The course includes statistical-based quality control, multivariate and statistical model-based quality control, fuzzy transformation, robust and nonparametric statistics, short production runs, and statistical process control for big data. Students are directed to analyze and evaluate the development of quality control methods and develop appropriate methodological approaches or innovations according to the characteristics and complexity of the data and process-related problems. Learning activities are conducted through literature studies,</i>																																																																							

	<i>scientific paper reviews, assignments, presentations, and discussions.</i>
Bahan Kajian: Materi Pembelajaran	Matematika, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, Industri dan Bisnis. <i>Mathematics, Statistical Theory, Data Collection, Description and Exploration, Computing and Data Processing, Industry and Business.</i>
Pustaka	Utama :
	1. Douglas C. Montgomery, (2009), Introduction to Statistical Quality Control, 6th Edition, John Wiley & Sons, Inc, USA 2. Besterfield, D.H., (2009), Quality Control 8th, Pearson International Edition, USA 3. Quesenberry, C.P., (1997), SPC Methods for Quality Improvement, John Wiley and Sons Inc., USA 4. Duncan, A.J., (1970), Quality Control and Industrial Statistics 3ed, D.B. Taraporevala Sons and Co., India 5. Journal of Quality Engineering 6. Journal of Quality Technology 7. Journal Technometrics
	Pendukung :
Dosen Pengampu	Prof. Dr. Muhammad Mashuri, MT; Dr. Wibawati, S.Si, M.Si; Dr. Muhammad Ahsan, S.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	Memahami aspek statistika dalam pengontrolan dan peningkatan kualitas. <i>Understand statistical aspects in quality control and improvement.</i>	Memahami kerangka konseptual aspek statistika dalam pengontrolan kualitas proses tipe: Shewhard, CuSum dan EWMA <i>Understanding the conceptual framework of statistical aspects in quality control processes types: Shewhard, CuSum and EWMA</i>	Belajar mandiri, presentasi, mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan <i>Independent study, presentation, expressing understanding, asking questions and answering questions</i>	Penugasan, presentasi diskusi 150 Menit <i>Assignment, discussion presentation 150 Minutes</i>		• Kerangka konseptual pengontrolan kualitas berbasis statistika • Pengontrolan kualitas multivariate type Shewhard, CuSum dan EWMA. • Statistical-based quality control conceptual framework	5%

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)
						• Quality control multivariate type Shewhard, CuSum and EWMA.	
2	Memahami kerangka konseptual, metodologi, dan penerapan dari sebuah pengembangan pengontrolan kualitas multivariate Understand the conceptual framework, methodology, and application of a multivariate quality control development	Mampu mengidentifikasi kelebihan dan kekurangan metode baru pengontrolan kualitas multivariat serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of new methods of multivariate quality control and the possibility of its development.	Belajar mandiri, presentasi, mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan Independent study, presentation, expressing understanding, asking questions and answering questions	Penugasan, presentasi diskusi 150 Menit Assignment, discussion presentation 150 Minutes		Kajian paper pengembangan diagram kontrol untuk karakteristik kualitas multivariate Paper review of control chart development for multivariate quality characteristics	5%
3 – 4	Memahami kerangka konseptual, metodologi, dan penerapan dari sebuah pengembangan pengontrolan kualitas berbasis model statistika Understand the conceptual framework, methodology, and application of a statistical model-based quality control development	Mampu mengidentifikasi kelebihan dan kekurangan metode baru pengontrolan kualitas berbasis model statistika serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of new methods of quality control based on statistical models and the possibility of their development.	Belajar mandiri, presentasi, mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan Independent study, presentation, expressing understanding, asking questions and answering questions	Penugasan, presentasi diskusi 300 Menit Assignment, discussion presentation 300 Minutes		Kajian paper pengembangan diagram kontrol berbasis model statistika Paper review of statistical model-based control chart development	10%
5 – 6	Memahami kerangka konseptual, metodologi,	Mampu mengidentifikasi kelebihan dan	Belajar mandiri, presentasi,	Penugasan, presentasi diskusi		Kajian paper pengembangan	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)
	dan penerapan dari sebuah pengembangan pengontrolan kualitas berbasis transformasi fuzzy Understand the conceptual framework, methodology, and application of a quality control development based on fuzzy transformation	kekurangan metode baru pengontrolan kualitas berbasis transformasi fuzzy serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of a new method of quality control based on fuzzy transformation and the possibility of its development.	mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan Independent study, presentation, expressing understanding, asking questions and answering questions	300 Menit Assignment, discussion presentation 300 Minutes		diagram kontrol berbasis transformasi fuzzy Paper review of fuzzy transformation-based control chart development	
7	Memahami kerangka konseptual, metodologi, dan penerapan dari sebuah pengembangan pengontrolan kualitas berbasis statistic robust Understand the conceptual framework, methodology, and application of a robust statistical-based quality control development	Mampu mengidentifikasi kelebihan dan kekurangan metode baru pengontrolan kualitas berbasis statistic robust serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of a new method of quality control based on robust statistics and the possibility of its development.	Belajar mandiri, presentasi, mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan Independent study, presentation, expressing understanding, asking questions and answering questions	Penugasan, presentasi diskusi 150 Menit Assignment, discussion presentation 150 Minutes		Kajian paper pengembangan diagram kontrol berbasis statistic robust Paper review of robust statistical-based control chart development	10 %
8	ETS MidTerm Exam						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)
9 – 10	Memahami kerangka konseptual, metodologi, dan penerapan dari sebuah pengembangan pengontrolan kualitas untuk short production run Understand the conceptual framework, methodology, and application of a quality control development for a short production run	Mampu mengidentifikasi kelebihan dan kekurangan metode baru pengontrolan kualitas untuk short production run serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of new quality control methods for short production runs and their possible development	Belajar mandiri, presentasi, mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan Independent study, presentation, expressing understanding, asking questions and answering questions	Penugasan, presentasi diskusi 300 Menit Assignment, discussion presentation answering questions 300 Minutes		Kajian paper pengembangan diagram kontrol untuk short production run Paper review of control chart development for short production run	10 %
11 – 12	Memahami kerangka konseptual, metodologi, dan penerapan dari sebuah pengembangan pengontrolan kualitas berbasis statistika non parametric Understand the conceptual framework, methodology, and application of a non-parametric statistics-based quality control development	Mampu mengidentifikasi kelebihan dan kekurangan metode baru pengontrolan kualitas berbasis statistika non parametrik serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of new methods of quality control based on non-parametric statistics and the possibility of its development.	Belajar mandiri, presentasi, mengemukakan pemahaman, mengajukan pertanyaan dan menjawab pertanyaan Independent study, presentation, expressing understanding, asking questions and answering questions	Penugasan, presentasi diskusi 300 Menit Assignment, discussion presentation answering questions 300 Minutes		Kajian paper pengembangan diagram kontrol berbasis statistika non parametric Paper review of non-parametric statistics-based control chart development	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)
13 - 15	Memahami kerangka konseptual, metodologi, dan penerapan dari sebuah pengembangan statistical process control untuk big data Understand the conceptual framework, methodology, and application of a statistical process control development for big data	Mampu mengidentifikasi kelebihan dan kekurangan metode baru statistical process control untuk big data serta kemungkinan pengembangannya. Able to identify the advantages and disadvantages of new statistical process control methods for big data and the possibility of its development.	Penugasan, presentasi diskusi Assignment, discussion presentation	Penugasan, presentasi diskusi 300 Menit Assignment, discussion presentation answering questions 300 Minutes		Kajian paper pengembangan statistical process control untuk big data Paper review of statistical process control development for big data	10 %
16	EAS Final Exam						