



RENCANA PEMBELAJARAN SEMESTER (SEMESTER LESSON PLAN)

Nomor Dok	FRM/KUL/01/02
Nomor Revisi	02
Tgl. Berlaku	1 Januari 2018
Klausur ISO	7.5.1 & 7.5.5

Disusun oleh (Prepared by)	Diperiksa oleh (Checked by)	Disetujui oleh (Approved by)	Tanggal Validasi (Valid date)
A. Haidar Mirza, S.T., M.Kom.	Alek Wijaya, S.Kom., M.IT	Dedy Syamsuar, S.Kom., M.IT., Ph.D	

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|---|---|---|
| 1. Fakultas (Faculty) | : Ilmu Komputer | |
| 2. Program Studi (Study Program) | : Teknik Informatika | Jenjang (Grade) : Strata 1 (S1) |
| 3. Mata Kuliah (Course) | : Big Data Analysis | SKS (Credit) : 2 SKS |
| 4. Kode Mata Kuliah (Code) | : 1423706 | Sertifikasi (Certification): <input type="checkbox"/> Ya (Yes) <input checked="" type="checkbox"/> Tidak (No) |
| 5. Mata Kuliah Prasyarat (Prerequisite) | : -..... | Semester (Semester) : 5 |
| 6. Dosen Koordinator (Coordinator) | : A. Haidar Mirza, S.T., M.Kom. | <input type="checkbox"/> Mandiri (Personal) |
| 7. Dosen Pengampuh (Lecturer) | : A. Haidar Mirza, S.T., M.Kom.
FEBRIYANTI PANJAITAN, M.Kom.
Hadi Syaputra, M.Kom.
Zaid Amin, S.Kom., M.Kom. | <input checked="" type="checkbox"/> Tim (Team) |
8. Capaian Pembelajaran Mata Kuliah (Course Learning Outcomes) :

Capaian Pembelajaran Lulusan (CPL) (Programme Learning Outcomes)	CPL05	Memiliki kemampuan untuk mengambil keputusan secara tepat berdasarkan hasil analisa informasi dan data
	CPL09	Memiliki kemampuan untuk menerapkan pengetahuan ilmu komputer menggunakan algoritma/ metode yang relevan
Capaian Pembelajaran Mata Kuliah (CPMK)	CPMK051	Mampu mengumpulkan dan mengolah data
	CPMK052	Mampu menganalisis informasi
	CPMK091	Mampu memilih algoritma/ metode yang relevan

(Course Learning Outcomes)		
SUB-CPMK0511	knows the applications and services that use big data and tools that can be used	
SUB-CPMK0512	can use manipulating and analyze data using spreadsheet	
SUB-CPMK0513	know how to visualization data using spreadsheet	
SUB-CPMK0514	know how to use tableau bar charts	
SUB-CPMK0521	know how to use sql query.	
SUB-CPMK0522	know how to manipulating data in Python and visualization data using Python	
SUB-CPMK0523	know simple data mining algorithm	
SUB-CPMK0524	know to use SQL and computing data mining using python	
SUB-CPMK0525	know how to write regression programing machine learning	
SUB-CPMK0911	understood classification and clustering concept in machine learning	
SUB-CPMK0912	know how to write classification and clustering program in machine learning	
SUB-CPMK0913	understood modeling network and programming	
SUB-CPMK0914	understood programming in unstructured data	
SUB-CPMK0915	determine correlation and causation concept	

	SUB-CPMK	CPL05		CPL09
		CPMK051	CPMK052	CPMK091
Matriks Sub-CPMK terhadap CPL dan CPMK	SUB-CPMK0511	√		
	SUB-CPMK0512	√		
	SUB-CPMK0513	√		
	SUB-CPMK0514	√		
	SUB-CPMK0521		√	
	SUB-CPMK0522		√	
	SUB-CPMK0523		√	
	SUB-CPMK0524		√	
	SUB-CPMK0525		√	
	SUB-CPMK0911			√
	SUB-CPMK0912			√
	SUB-CPMK0913			√
	SUB-CPMK0914			√
	SUB-CPMK0915			√

9. Deskripsi Mata Kuliah

Deskripsi Singkat Mata Kuliah	Mata kuliah ini membahas fenomena, framework, peluang dan tantangan Big Data. Selain itu, Memahami konsep, teori, framework dari aktivitas Data Analytics dan mampu memilih dan melakukan aktivitas Data Analytics yang sesuai dengan konteks masalah bisnis yang dihadapi serta mampu membuat model deskripsi dan prediksi menggunakan data yang tersedia
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10. Bahan Kajian

Bahan Kajian (Materi Pembelajaran)	<ol style="list-style-type: none"> a. Overview of Big Data - Promises and Pitfalls, Tools and Techniques b. Data Analysis Using Spreadsheets c. Data Visualization Using Spreadsheets d. Advanced Data Visualization Using Tableau e. Relational Databases and SQL f. Python for Data Analysis and Visualization g. Data Mining Algorithms h. Data Mining Using Python and SQL i. Machine Learning – Regression j. Machine Learning - Classification & Clustering k. Using Python for Machine Learning l. Network Analysis m. Unstructured Data n. Correlation and Causation
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11. Implementasi Pembelajaran Mingguan (*Implementation Process of weekly learning time*)

Minggu	Sub CPMK (Kemampuan akhir yang direncanakan)	Bahan Kajian/Materi Pembelajaran (<i>Study Material</i>)	Bentuk dan Metode Pembelajaran [Estimasi Waktu] (<i>Learning Method</i>)	Sumber Belajar (<i>Learning Resource</i>)	Penilaian		
					Indikator (<i>Indicator</i>)	Kriteria & bentuk	Bobot
1	Student knows the applications and services	<ul style="list-style-type: none"> • Data-driven applications and services; 	Kuliah dan Diskusi (Luring)	BUKU REFERENSI:	- can respond material	Kriteria :Ketepatan dan	5%

	that use big data and tools that can be used	<ul style="list-style-type: none"> brief introduction to data manipulation and analysis, data mining, machine learning, data visualization, data collection and preparation; pitfalls: correlation and causation, underfitting and overfitting, privacy, and others; brief introduction to languages, systems, and platforms for big data 	<p>Tatap Muka [TM: 1x(3x50'')]</p> <p>Tugas : Menjelaskan ringkasan konsep Overview of Big Data - Promises and Pitfalls, Tools and Techniques [PT+BM: (1+1)x(3x60'')]</p>	[1] -[4]	<ul style="list-style-type: none"> - well in discussions - can answer questions. - Able to complete the assignment given 	penguasaan Bentuk : Tugas 1 Kuis	
2	Students can use manipulating and analyze data using spreadsheet	<ul style="list-style-type: none"> Manipulating and analyzing data using spreadsheets including pivot tables 	<p>Kuliah dan Diskusi (Daring) Elearning [TM: 1x(3x50'')]</p> <p>Tugas : Menjelaskan ringkasan konsep Data Analysis Using Spreadsheets [PT+BM: (1+1)x(3x60'')]</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. - Able to complete the assignment given 	Kriteria : Ketepatan dan penguasaan Bentuk : Tugas 2 Kuis	5%
3	Students know how to visualization data using spreadsheet	<ul style="list-style-type: none"> Data visualization motivation spreadsheet bar charts, pie charts, scatterplots, maps 	<p>Kuliah dan Diskusi (Luring) Tatap Muka [TM: 1x(3x50'')]</p> <p>Tugas : Menjelaskan ringkasan konsep Data Visualization Using Spreadsheets [PT+BM: (1+1)x(3x60'')]</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. - Able to complete the assignment given 	Kriteria : Ketepatan dan penguasaan Bentuk : Tugas 3 Kuis	5%
4	Students know how to use tableau bar charts	<ul style="list-style-type: none"> Tableau bar charts, pie charts, scatterplots, packed bubbles, maps; Tableau dashboards; 	<p>Kuliah dan Diskusi (Daring) Elearning [TM: 1x(3x50'')]</p> <p>Tugas : Menjelaskan Advanced Data Visualization Using</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. - Able to complete the assignment given 	Kriteria : Ketepatan dan penguasaan Bentuk : Tugas 4 Kuis	5%

			Tableau [PT+BM: (1+1)x(3x60'')]				
5	Students know how to use sql query.	<ul style="list-style-type: none"> • Introduction to relational database management systems (RDBMS); relational data model; • creating and loading data; • basics of SQL query language • More advanced SQL constructs (aggregation, subqueries, data modification, and others); • coverage configurable to available time 	<p>Kuliah dan Diskusi (Luring) Tatap Muka [TM:1x(3x50'')] Tugas : Menjelaskan Relational Databases and SQL [PT+BM: (1+1)x(3x60'')]</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<p>- can respond material - well in discussions - can answer questions. - Able to complete the assignment given</p>	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 5 UTS</p>	5%
6	Students know how to manipulating data in Python and visualization data using Python	<ul style="list-style-type: none"> • Introduction to Python; • manipulating data in Python; • plotting in Python; • Pandas package 	<p>Kuliah dan Diskusi (Daring) Elearning [TM:1x(3x50'')] Tugas : Menjelaskan Python for Data Analysis and Visualization [PT+BM: (1+1)x(3x60'')]</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<p>- can respond material - well in discussions - can answer questions. - Able to complete the assignment given</p>	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 6 UTS</p>	5%
7	Students know simple data mining algorithm	<ul style="list-style-type: none"> • History of data mining; • market-basket data; • frequent item-sets; • association rules 	<p>Kuliah dan Diskusi (Daring) Elearning [TM:1x(3x50'')] Tugas : Menjelaskan Data Mining Algorithms [PT+BM: (1+1)x(3x60'')]</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<p>- can respond material - well in discussions - can answer questions. - Able to complete the assignment given</p>	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 7 UTS</p>	5%
8	Students know to use SQL and computing data mining using python	<ul style="list-style-type: none"> • Computing frequent item-sets and association rules using relational databases and SQL • Computing frequent item-sets and association rules using Python 	<p>Kuliah dan Diskusi (Luring) Tatap Muka [TM:1x(3x50'')] Tugas : Menjelaskan Data Mining Using Python and SQL [PT+BM:</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<p>Student will be understood classification and clustering concept in machine learning</p>	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 8 UTS</p>	5%

			(1+1)x(3x60")]				
9	Students know how to write regression program in machine learning	<ul style="list-style-type: none"> Regression introduction and applications; simple linear regression; regression and correlation; regression shortcomings and dangers; polynomial regression 	<p>Kuliah dan Diskusi (Daring) Elearning [TM: 1x(3x50")] Tugas : Menjelaskan Machine Learning - Regression [PT+BM: (1+1)x(3x60")]</p>	<p>BUKU REFERENSI: [1] -[4]</p>	<p>- can respond material - well in discussions - can answer questions. - Able to complete the assignment given</p>	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 9 UTS</p>	10%
UTS							
11	Student will be understood classification and clustering concept in machine learning	<ul style="list-style-type: none"> Introduction to classification; k-nearest-neighbors; decision trees; Naïve Bayes classifiers Introduction to clustering; k-means 	<p>Kuliah dan Diskusi (Luring) Tatap Muka [TM: 1x(3x50")] Tugas : Menjelaskan Machine Learning - Classification & Clustering [PT+BM: (1+1)x(3x60")]</p>	<p>BUKU REFERENSI: [1] -[4]</p> <p>PENELITIAN Deep learning with focal loss approach for attacks classification</p> <p>Perbandingan Metode Naïve Bayes Dan Support Vector Machine Dalam Klasifikasi Penyakit Diabetes Melitus (http://journal =</p>	<p>- can respond material - well in discussions - can answer questions. - Able to complete the assignment given</p>	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 10 UAS</p>	10%

				<p>computing.org/index.php/journal-ita/article/view/31)</p> <p>Prediksi Kebutuhan Alat Kesehatan Rumah Sakit Menggunakan Metode Algoritma Regression Linier dan Naïve Bayes</p> <p>Analisis Sentimen Masyarakat Terhadap Pilpres 2019 Berdasarkan Opini Dari Twitter Menggunakan Metode Naive Bayes Classifier (http://poltekanka.ac.id/journal/index.php/inf/article/view/201)</p> <p>Analisis Sentimen Serikat Pekerja Pertamina Tolak Ahok Pada Media Sosial Youtube Menggunakan Algoritma Naive Bayes</p>		
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				Application of Naive Bayes Classifier Algorithm in Determining New Student Admission Promotion Strategies			
12	Student know how to write classification and clustering program in machine learning	<ul style="list-style-type: none"> Python packages for regression, classification, and clustering 	<p>Kuliah dan Diskusi (Daring) Elearning [TM:1x(3x50")] Tugas : Menjelaskan Using Python for Machine Learning [PT+BM: (1+1)x(3x60")]</p>	<p>BUKU REFERENSI: [1] –[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. - Able to complete the assignment given 	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 11 UAS</p>	10%
13	Student will be understood modeling network and programming	<ul style="list-style-type: none"> Modeling networks as undirected and directed graphs; 15analyzing graph properties; programming using networkx package 	<p>Kuliah dan Diskusi (Daring) Elearning [TM:1x(3x50")] Tugas : Menjelaskan Network Analysis [PT+BM: (1+1)x(3x60")]</p>	<p>BUKU REFERENSI: [1] –[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. - Able to complete the assignment given 	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 12 UAS</p>	10%
14	Students will be understood programming in unstructured data	<ul style="list-style-type: none"> Text analysis & natural-language processing; image analysis; video analysis 	<p>Kuliah dan Diskusi (Daring) Elearning [TM:1x(3x50")] Tugas : Menjelaskan Unstructured Data [PT+BM: (1+1)x(3x60")]</p>	<p>BUKU REFERENSI: [1] –[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. - Able to complete the assignment given 	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 13 UAS</p>	10%
15	Student can be determine correlation and causation concept	<ul style="list-style-type: none"> correlation versus causation; determining correlation; determining causation 	<p>Kuliah dan Diskusi (Luring) Tatap Muka [TM:1x(3x50")]</p>	<p>BUKU REFERENSI: [1] –[4]</p>	<ul style="list-style-type: none"> - can respond material - well in discussions - can answer questions. 	<p>Kriteria :Ketepatan dan penguasaan Bentuk : Tugas 14</p>	10%

			Tugas : Menjelaskan Correlation and Causation [PT+BM: (1+1)x(3x60'')]		- Able to complete the assignment given	UAS	
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UAS

12. Pengalaman Belajar Mahasiswa (*Student Learning Experiences*)
Discuss, Quiz

13. Kriteria dan Bobot Penilaian (*Criteria and Evaluation*)

CPL	CPMK	MBKM	Observasi (Praktek)	Unjuk Kerja (Presentasi)	Tes Tertulis		Tes Lisan (Tgs Kel)
					UTS	UAS	
CPL05	CPMK051				√		
	CPMK052				√	√	
CPL09	CPMK091					√	

CPL	CPMK	Tahap Penilaian	Teknik Penilaian	Instrumen	Kriteria	Bobot
CPL03	CPMK031	Ujian Tengah Semester	Tes Tertulis (UTS)	Rubrik	Kelengkapan Jawaban	30%
	CPMK032	Ujian Tengah Semester, Akhir Semester	Tes Tertulis (UTS), Tes Tertulis (UAS)	Rubrik, Rubrik	Kelengkapan Jawaban, Kelengkapan Jawaban	20% 20%
CPL09	CPMK091	Akhir Semester	Tes Tertulis (UAS)	Rubrik	Kelengkapan Jawaban	30%

CPL	MK	CPMK	MBKM	Partisipasi (Kehadiran)	Observasi (Praktek)	Unjuk Kerja (Presentasi)	Tes Tertulis (UTS)	Tes Tertulis (UAS)	Tes Lisan (Tugas)	Total
CPL05	MK35	CPMK051					30			30
CPL05	MK35	CPMK052					20	20		40
CPL09	MK35	CPMK091						30		30

Rubrik Penilaian MK Big Data Analysis

No	Kategori / Metode Evaluasi	CPMK	Model Soal	Indikator Penilaian			
				Kurang 55 - <65	Cukup 65 - <75	Baik 75 - <85	Sangat Baik 85-100
1	UTS	CPMK051	Menjawab the applications and services that use big data and tools that can be used, manipulating and analyze data using spreadsheet, visualization data using spreadsheet, tableau bar charts	Mahasiswa tidak mampu Menjawab the applications and services that use big data and tools that can be used, manipulating and analyze data using spreadsheet, visualization data using spreadsheet, tableau bar charts.	Mahasiswa cukup mampu Menjawab the applications and services that use big data and tools that can be used, manipulating and analyze data using spreadsheet, visualization data using spreadsheet, tableau bar charts.	Mahasiswa mampu Menjawab the applications and services that use big data and tools that can be used, manipulating and analyze data using spreadsheet, visualization data using spreadsheet, tableau bar charts	Mahasiswa sangat mampu Menjawab the applications and services that use big data and tools that can be used, manipulating and analyze data using spreadsheet, visualization data using spreadsheet, tableau bar charts
		CPMK052	Menjawab manipulating data in Python and visualization data using Python, simple data mining algorithm, use SQL and computing data mining using python, write regression programing machine learning	Mahasiswa tidak mampu Memahami manipulating data in Python and visualization data using Python, simple data mining algorithm, use SQL and computing data mining using python, write regression programing machine learning	Mahasiswa cukup mampu Menjawab Memahami manipulating data in Python and visualization data using Python, simple data mining algorithm, use SQL and computing data mining using python, write regression programing machine learning	Mahasiswa mampu Menjawab manipulating data in Python and visualization data using Python, simple data mining algorithm, use SQL and computing data mining using python, write regression programing machine learning	Mahasiswa sangat mampu Menjawab manipulating data in Python and visualization data using Python, simple data mining algorithm, use SQL and computing data mining using python, write regression programing machine learning.
2	UAS	CPMK091	Menjawab classification and clustering concept	Mahasiswa tidak mampu Menjawab classification and	Mahasiswa cukup mampu Menjawab classification and	Mahasiswa mampu Menjawab classification and	Mahasiswa mampu Menjawab classification and

			in machine learning, write classification and clustering program in machine learning, modeling network and programming, programming in unstructured data, determine correlation and causation concept	clustering concept in machine learning, write classification and clustering program in machine learning, modeling network and programming, programming in unstructured data, determine correlation and causation concept	clustering concept in machine learning, write classification and clustering program in machine learning, modeling network and programming, programming in unstructured data, determine correlation and causation concept	clustering concept in machine learning, write classification and clustering program in machine learning, modeling network and programming, programming in unstructured data, determine correlation and causation concept	clustering concept in machine learning, write classification and clustering program in machine learning, modeling network and programming, programming in unstructured data, determine correlation and causation concept
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a. Bobot penilaian (Ketentuan Bina Darma)

- ≥ 85 = A
- ≥ 70 s.d < 85 = B
- ≥ 60 s.d < 70 = C
- ≥ 50 s.d < 60 = D
- < 50 = E

14. BukuSumer(*References*):

- [1] Jovan Pehceviski , Big Data Analytics - Methods and Applications, 2019, Arcler Press
- [2] Thomas Erl,WajidKhattak, and Paul Buhler;Big data fundamentals: concepts, drivers & techniques; 2016; Prentice Hall
- [3] Professor: Jennifer Widom, CS 102: Big Data Tools and Techniques- Winter 2019,
<https://web.stanford.edu/class/cs102/index.htm>
- [4] Imam Cholissodin Efi Riyandani ; ANALISIS BIG DATA (Teori & Aplikasi); 2018; ANALISIS BIG DATA (Teori &

Aplikasi); Penerbit Universitas Brawijaya

