

1.Course Identity

Course name (Nama mata kuliah)	Information Technology and Big Data		
Faculty (Fakultas)	Mathematics and Natural Science	Study Program (Program Studi)	Statistics
Code (Kode)	SST-409	Credit poin Sks (Bobot Sks)	3
Group (Grup)	Study Program	Enrollment obligatory (Sifat pengambilan)	mandatory / optional*
Semester(s) in which the course is taught (Semester)	4	Availability (Ketersediaan)	Limited
Learning method (Bentuk pembelajaran)	blended learning/ online learning*	Media (Media)	Digital files (slides, video, sheet, etc)
Course category (Rumpun mata kuliah/blok)	university compulsory course/ SSP compulsory course/ practicum/ compulsory of scientific interest/ elective course*	Requirements (Prasyarat)	Database
Lecture (Dosen pengampu)	Arum Handini Primandari, M.Sc.	Semester/ Academic year (Semester/ Tahun Akademik)	Odd Semester 2020/2021

*) cross the unnecessary ones

2a. PROGRAM LEARNING OUTCOME (CAPAIAN PEMBELAJARAN LULUSAN)

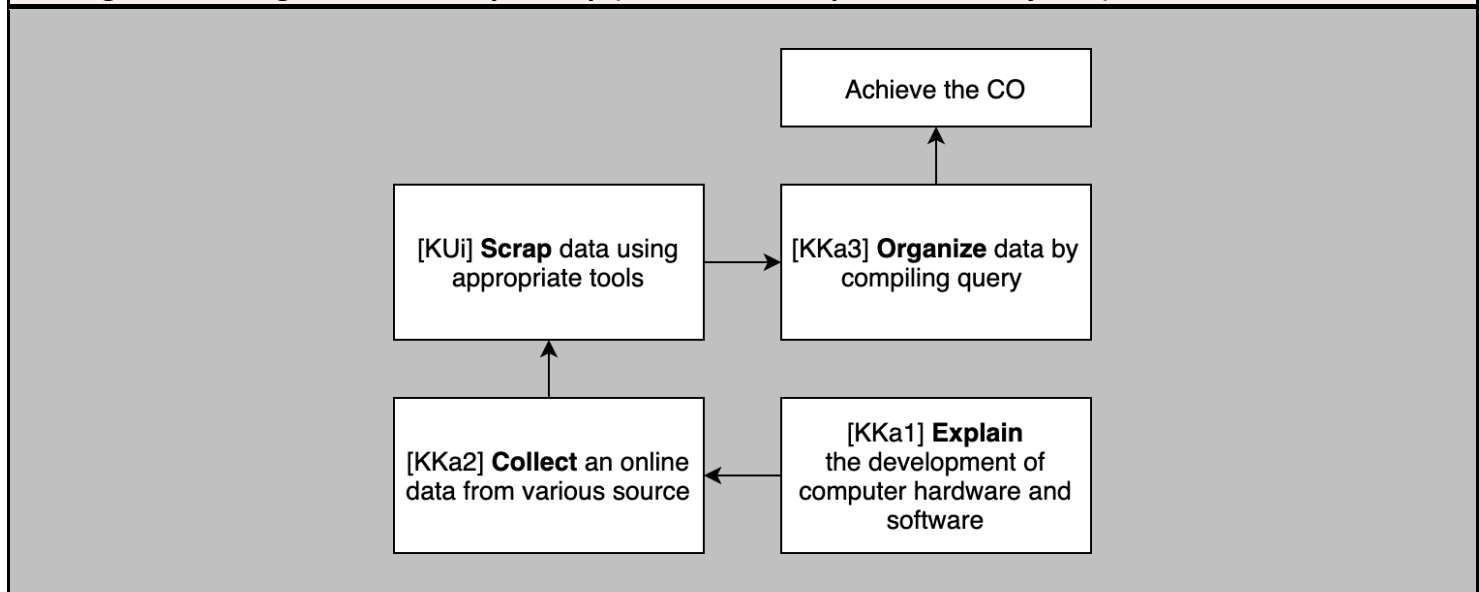
LO Code (Kode CPL)	LO Description (Rumusan CPL)
Kka (Technique)	Able to design experiments, including the collection and generation of data (in the form of surveys, experiments or simulations), organizing the data, analysis of the data using statistics techniques and the extraction of valid conclusions by utilizing a minimum of one device type of software statistics
Kui (Technique)	Capable of documenting, storing, securing, and determining the background of data to ensure authenticity and prevent plagiarism

2b. COURSE OUTCOME (CAPAIAN PEMBELAJARAN MATA KULIAH)

Support ed PLO Code (Kode CPL yang didu- kung)	CO Code (Kode CPMK)	CO Descriptions and Indicators (Rumusan CPMK dan Indikator)	Learning Experience (Pengalaman Pembelajaran)	Assessment (Asesmen/penilaian)	Wei ght (Bo - bot)
KKa	Kka1	Students are able to explain the development of computer hardware and statistics software	1. Students explain the history of the development of computer hardware by creating a timeline	Quiz, Assignment	20

			2. Students explain the concept of databases for big data using hadoop and big query 3. Students employ the cross validation method to validate data		
	KKa2	Students are able to collect data	1. Students collect online data in several formats: csv, xml, json, and geojson 2. Students read and transform the format of the collected data into the data which is ready to be analyzed	Quiz, Assignment	15
	KKa3	Students are able to organize data	1. Students set up a Google Bigquery account to do a project 2. Students conduct queries to retrieve data on the Public Bigquery Database 3. Students compile sub-queries to retrieve data in the Public Big Query Database	Final Exam	30
KUi	Kui1	Student are able to carry out web scraping	1. Students scrape data from social media or websites by utilizing the appropriate tools (dataminer, parsehub, etc) 2. Student clean up the scraped data	Midterm Exam	35

3. Program Learning Outcome Analysis Map (*Peta Analisis Capaian Pembelajaran*)



4. Reference (*Referensi*)

- Hastie, T., Tibshirani, R., and Friedman, J., 2009, The Elements of Statistical Learning: Data Mining, Inference, Prediction, Springer.
- Chen, et al., 2014, Big Data Related Technologies, Challenges and Future Prospects, Springer.
- Milton, M., 2009, Head First Data Analysis, O'Reilly.

5. Detail of Learning Activities (*Rincian Aktivitas Pembelajaran*)

Sessio n (sesi)	LOC/Sub- LOC/Criterio n	Study Material (<i>Bahan Kajian</i>)	Activity Design and Duration (<i>Rancangan Aktivitas dan Durasi</i>)	Mode	Learning Media/ Reference (<i>Media Pembelajaran/ Referensi</i>)
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	(CPMK/Sub-CPMK/Kriteria)				
1.	KKa1	The development of computer hardware and software	- Lecture explains an introduction of computer age (duration 30-45 minutes); - Students create timeline of computer hardware/ software on specific topic such as the development of apps (duration 100-120 minutes)	FF	Slides 1
2.	KKa1	The problem of Big Data and its database (Hadoop)	- Lecturer provides a trigger of big data problems for discussion by the students through discussion forums (100 minutes) - Students take quiz (50 minutes)	FF	Slides 2 Quizz 1
3.	KKa2	Online data collecting: csv, json, and geojson	- Lecture provides an example of a credible online data source through video - Students collect the data in online source	SAA	Video 1: online data source Assignment 1: collect data
4.	KKa2	Reading dan writing data: csv, json, and geojson	- Lecture explains how to read and write data in various formats using R through video - Students read and write data (csv, json, and geojson) using R - Students transform the data from dataframe into csv	SAA	Video 2: read and write data Assignment 2: write and read data json
5.	Kui1	Scraping data using dataminer	- Lecture gives an introduction of web scraping - Lecture provides an example of webscraping using data miner through video - Students scrap a website using data miner	FFO	Video 3: scraping using data miner Slides: introduction to web scraping Assignment 3: scraping with data miner
6.	Kui1	Scraping data using parsehub	- Lecture provides a trigger of scraping problem in sub-page - Student install and follow the tutorial of using parsehub - Student scrap a website contain sub-page using parsehub	FFO	Video 4: scraping using parsehub Assignment 4: scraping with parsehub
7.	Kui1	Problem with scraping: various pagination	- Lecture provides problems in scraping: pagination with next button, without next button, and infinite scroll - Students scrap a website employing pagination	FF	Video 5: pagination
8.		Midterm Exam			
9.	Kui1	Data cleaning	- Students clean up the scraped data into data which is ready to be analyzed	FF	
10.	Kui1	Introduction to query using various tools: hadoop, bigquery, R, and python	- Lecture explains the introduction of query language and query tools - Students compose a query for big data	FF	Video 6: query using R
11.	KKa3	SQL: data manipulation language	- Lecture explains about DML (Data Manipulation Language) and its function - Students practice to use DML function in query	SAA	Video 7: DML Slides: DML Assignment 5: DML
12.	KKa3	Employing query function related to time manipulation	- Lecture provides problem in extracting data containing time information	SAA	Video 8: Query using time function

			- Students compose a query by utilizing functions to handle time data		Assignment 6: query using time function
13.	KKa3	Joining table	- Lecture gives problem which needs a join table in extracting data - Students compile a query containing joining table	SAA	Video 9: Join Tabel in Query Assignment 7: query join table
14.	KKa3	Subquery in clause form	- Lectures provides a problem which needs a sub-query method in extracting data - Students compose a sub-query using clause form	FF	Video 10: Sub-query 1 Slides: subquery
15.	KKa3	Subquery in with clause	- Students compile a sub-query using with clause	SAA	Video 11: Subquery with clause Assignment 4: sub-query
16.	KKa3	Final Exam			

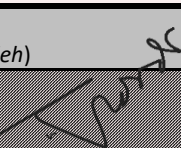
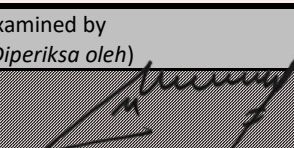
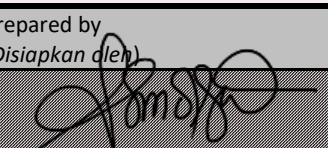
Information:

For mode, enter one of the following codes

- FF = activities that require **face-to-face** meetings in class (*aktivitas yang memerlukan tatap muka (TM) langsung di kelas*);
- FFO = activities that require **face to face online** (*aktivitas yang memerlukan tatap muka secara daring (tatap maya/TMD)*);
- SAA = standalone asynchronous online activity (*aktivitas daring asinkron mandiri/ASM*);
- CAA = collaborative asynchronous online activities (*aktivitas daring asinkron kolaborasi/ASK*);

Learning / reference media can be in the form of (1) self-produced results, (2) curated results: media sourced from the internet or other sources chosen by the lecturer, and / or (3) students' own exploration results.

6. Assessment and Evaluation System (<i>Sistem Penilaian dan Evaluasi</i>)	
Assessment System (<i>Sistem Penilaian</i>)	The grading system uses one of these two systems: • PAP (<i>Penilaian Acuan Patokan</i>/ Benchmark Reference Assessment) is an assessment using the University / Faculty / Study Program's standard values. • PAN (<i>Penilaian Acuan Normal</i>/ Normal Reference Assessment) is an assessment based on relative class passing standards, for example based on a normal distribution.
Evaluation System (<i>Sistem Evaluasi</i>)	Evaluation is a decision taken after students finish lectures. Each student must achieve a minimum grade / predicate of C for the overall average score. If it has not fulfilled it, then the student is obliged to carry out an examination / repair assignment.

Date:	Date:	Date:
Validated by (Disahkan oleh)	Examined by (Diperiksa oleh)	Prepared by (Disiapkan oleh)
		
Dr. Edy Widodo, M.Si.	Muhammad Muhajir, M.Sc.	Arum Handini Primandari, M.Sc.