MODULE HANDBOOK

INTRODUCTION TO STATISTICAL METHOD

BACHELOR DEGREE PROGRAM
DEPARTEMENT OF STATISTICS
FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

ENDORSEMENT PAGE

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INTRODUCTION TO STATISTICAL METHOD
DEPARTMENT OF STATISTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Proses ***Process***	**Penanggung Jawab** ***Person in Charge***			**Tanggal** ***Date***
	Nama ***Name***	**Jabatan** ***Position***	**Tandatangan** ***Signature***	
Perumus *Preparation*	Erma Oktania P. M.Si.	Dosen *Lecturer*		**March 28, 2019**
Pemeriksa dan Pengendalian *Review and Control*	Erma Oktania P. M.Si;Dr. Agnes Tuti Rumiati;Dr. Ismaini Zain ;Dr. Vita Ratnasari	Tim kurikulum *Curriculum team*		**April 15, 2019**
Persetujuan *Approval*	Dr. Santi Wulan Purnami, M.Si	Koordinator RMK *Course Cluster Coordinator*		**July 17, 2019**
Penetapan *Determination*	Dr. Kartika Fithriasari, M.Si	Kepala Departemen *Head of Department*		**July 30, 2019**

MODULE HANDBOOK

INTRODUCTION TO STATISTICAL METHOD

Module name	**INTRODUCTION TO STATISTICAL METHOD**	
Module level	Undergraduate	
Code	KS184101	
Course (if applicable)	INTRODUCTION TO STATISTICAL METHOD	
Semester	First Semester (Ganjil)	
Person responsible for the module	Erma Oktania P. M.Si.	
Lecturer	Erma Oktania P. M.Si;Dr. Agnes Tuti Rumiati;Dr. Ismaini Zain ;Dr. Vita Ratnasari	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergradute degree program, **mandatory**, 1st semester.	
Type of teaching, contact hours	Lectures, <50 students	
Workload	1. Lectures : 3 x 50 = 150 minutes per week. 2. Exercises and Assignments : 3 x 60 = 180 minutes (3 hours) per week. 3. Private learning : 3 x 60 = 180 minutes (3 hours) per week.	
Credit points	3 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	*CLO.1 Able to understand and explain the use of data exploration concepts in data analysis* *CLO.2 Able to explain the Data Exploration procedure* *CLO.3 Able to analyze data with appropriate statistical methods and interpret them in the field of Data Exploration Techniques in data analysis* *CLO.4 Able to identify, formulate, and solve statistical problems using data exploration techniques* *CLO.5 Able to use modern computing techniques and computer equipment required in the field of data exploration techniques*	PLO-01 PLO-03

	CLO.6 Have knowledge of current and future issues related to the field of data exploration techniques *CLO.7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams* *CLO.8 Have professional responsibilities and ethics* *CLO.9 Able to motivate oneself to think creatively and learn lifelong*	PLO-04
Content	*Introduction to the Statistical Method is a course that supports the graduate learning outcomes (PLO) of study programs, namely: PLO-1, PLO-3, PLO-4, PLO-6, PLO-7, PLO-8, and PLO-9. After attending this course, students are expected to be able to analyze data and be able to formulate problems into statistical problems and solve with and without the help of computers, especially univariate data, starting from testing 1 population parameters, comparing 2 population parameters, to making a relationship pattern of 2 variables (response and predictors). The learning method used is through face-to-face lectures, discussions, and practice questions. Assignments are given in groups and assessments are carried out through class activities, presentations, making reports and written examinations.*	
Study and examination requirements and forms of examination	• In-class exercises • Assignment 1, 2, 3 • Mid-term examination • Final examination	
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.	
Reading list	1. Anderson, A., 2015. *Statistics for Big Data*. For Dummies Publisher. 2. Ang, A.H-S. and Tang, W.H., 2007. *Probability Concepts in Engineering: Emphasis on Applications to Civil and Environmental Engineering*. 2nd edition. New York: John Wiley and Sons. 3. Freedman, D., Pisani, R., and Purves, R., 2007. *Statistics*. 4th edition. W. W. Norton dan Company. 4. Johnson, R.A. and Bhattacharyya, G.K., 2014. *Statistics: Principles and Concepts*. 7th edition. New York: John Wiley and Sons. 5. Walpole, R. E., Myers, R.H., Myers, S.L., and Ye, K.E., 2012. *Probability and Statistics for Engineers and Sciences*. 9th edition. Boston: Prentice Hall.	

	Program Studi	Sarjana, Departemen Statistika, FMKSD-ITS
	Mata Kuliah	Pengantar Metode Statistika
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	MK Prasyarat	-
RP-S1	Dosen Pengampu	Dr. Vita Ratnasari, S.Si, M.Si ; Wibawati, S.Si, M.Si

Bahan Kajian *Study Materials*	Dasar Sains, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, dan Pemodelan *Basic Science, Statistical Theory, Data Collection, Description and Exploration, Computing and Data Processing, and Modeling*
CPL yang dibebankan MK *PLO*	CPL-1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi CPL-3 Mampu menganalisis data dengan metode statistika yang tepat dan mengintepretasikannya CPL-4 Mampu mengindentifikasi,memformulasi, dan menyelesaikan masalah statistika di berbagai bidang terapan *PLO-1 Able to apply knowledge of statistical theory, mathematics, and computation* *PLO-3 Able to analyze data with appropriate statistical methods and interpret them* *PLO-4 Able to identify, formulate, and solve statistical problems in various applied fields*
CP-MK *CLO*	CPMK.1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi: Mampu menyajikan data dan memberikan interpretasi informasi dari sekelompok data, mampu menghitung peluang suatu kejadian, ekspektasi dan varians dari suatu variabel random diskrit dan kontinu, Mampu menaksir parameter populasi CPMK.2 Mampu melakukan pengujian hipotesis sesuai masalah sesuai prosedur CPMK.3 Mampu menganalisis data dengan metode statistika yang tepat dan mengintepretasikannya CPMK.4 Mampu mengindentifikasi,memformulasi, dan menyelesaikan masalah statistika di berbagai bidang terapan CPMK.5 Mampu mengambil keputusan yang tepat berdasarkan analisis informasi dan data, serta mampu mengkomunikasikan hasil analisis baik secara lisan maupun tertulis CPMK.7 Mampu berkomunikasi secara efektif dan bekerjasama dalam tim yang interdisiplin dan multidisiplin CPMK.8 Memiliki tanggung jawab dan etika profesi CPMK.9 Mampu memotivasi diri untuk berpikir kreatif dan belajar sepanjang hayat *CLO.1 Able to understand and explain the use of data exploration concepts in data analysis* *CLO.2 Able to explain the Data Exploration procedure* *CLO.3 Able to analyze data with appropriate statistical methods and interpret them in the field of Data Exploration Techniques in data analysis* *CLO.4 Able to identify, formulate, and solve statistical problems using data exploration techniques* *CLO.5 Able to use modern computing techniques and computer equipment required in the field of data exploration techniques* *CLO.7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams* *CLO.8 Have professional responsibilities and ethics* *CLO.9 Able to motivate oneself to think creatively and learn throughout life*

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Perte-muan *Meeting*	**Kemampuan Akhir Sub CP-MK** *Final Ability*	**Keluasan (materi pembelajaran)** *Extent (learning material)*	**Metode Pembelajaran** *Learning methods*	**Estimasi Waktu** *Duration*	**Bentuk Evaluasi** *Evaluation Type*	**Kriteria dan Indikator Penilaian** *Assessment Criteria and Indicators*	**Bobot Penilaian** *Scoring*
1-2	1. Mampu menyajikan data dan memberikan interpretasi informasi dari sekelompok data	Pengertian konsep-konsep dalam Statistika: populasi, sampel, parameter, statistik Statistik deskriptif	Ceramah Interaktif Diskusi (CID) Latihan Soal	300 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 1	a) Dapat menghitung ukuran pemusatan data (rata-rata, median, dan modus) b) Dapat menghitung ukuran penyebaran data (standar deviasi, varians, dan range) c) Dapat memberikan interpretasi ukuran pemusatan dan ukuran penyebaran d) Dapat mengeksplorasi data menggunakan grafik/diagram (dot plot, histogram, poligon, bar chart, pie chart, box plot).	10% / 10%
1-2	*ability to present data and provide interpretation of information from a group of data*	*Understanding the concepts in Statistics: population, sample, parameters, statistics* *Descriptive statistics*	*Interactive Lecture Discussion (CID)* *Exercise*	*300 minutes*	*Observation Test Classroom activity (TOA)* *Task 1*	*a) Can calculate the size of data concentration (mean, median, and mode)* *b) Can be adjusted calculate the size of the spread of data (standard deviation, variance, and range)* *c) Can provide interpretation of centering size and dispersion size* *d) Can explore data using graphs / diagrams (dot plot, histogram, polygon, bar chart, pie chart, box plot).*	*10% / 10%*

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3	2. Mampu menghitung ekspektasi (rata-rata) dan varians suatu variabel random	Fungsi peluang	Ceramah Interaktif Diskusi (CID) 1. Latihan Soal	150 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 2	a. Dapat menghitung peluang suatu kejadian dan menerapkan Teorema Bayes b. Dapat merumuskan fungsi diskrit (pmf) dan fungsi kontinyu (pdf)	10% / 20%
3	*Able to calculate expectation (average) and variance of a random variable*	*Probability function*	*Interactive Lecture Discussion (CID)* *Exercise*	*150 minutes*	*Observation Test Classroom activity (TOA)* *Task 2*	*a. Can calculate the probability of an event and apply Bayes' Theorem* *c. Can formulate discrete functions (pmf) and continuous functions (pdf)*	*10% / 20%*
4-5	3. Mampu menghitung peluang variabel random diskrit	Fungsi Distribusi Diskrit	Ceramah Interaktif Diskusi (CID) 1. Latihan Soal	300 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 3	a. Dapat mengidentifikasi distribusi diskrit: Binomial, Binomial Negatif, Geometrik, Hipergeometrik dan Poisson b. Dapat menghitung peluang kejadian berdasarkan distribusi diskrit tersebut	10% / 30%
4-5	*Be able to calculate odds of discrete random variables*	*Discrete Distribution Function*	*Interactive Lecture Discussion (CID)* *Exercise*	*300 minutes*	*Observation Test for Classroom Activities (TOA)* *Task 3*	*a. Can identify discrete distributions: Binomial, Binomial Negative, Geometric, Hypergeometric and Poisson*	*10% / 30%*

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						c. Can calculate the probability of events based on the discrete distribution	
6	4. Mampu menghitung peluang variabel random kontinyu	Fungsi Distribusi Kontinyu	Ceramah Interaktif Diskusi (CID) 1. Latihan Soal	150 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 4	a. Dapat menghitung kejadian berdasarkan distribusi Normal dan distribusi Eksponensial b. Dapat menjelaskan Teorema Limit Central	10% / 40%
6	*Able to calculate the probability of continuous random variables Continuous*	*Distribution Function*	*Interactive Lecture Discussion (CID)* *Exercise*	*150 minutes*	*Observation Test Classroom Activity (TOA)* *Assignment 4*	*a. Can count events based on Normal distribution and Exponential distribution* *c. Can be described Assume Central Limit Theorem*	*10% / 40%*
7	5. Mampu menaksir parameter populasi	Estimasi dan Distribusi Sampling	Ceramah Interaktif Diskusi (CID) Latihan Soal	150 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 5	a. Dapat menaksir rata-rata satu populasi dan selisih dua populasi b. Dapat menaksir varians dan selisih dua varians c. Dapat menaksir proporsi dan selisih dua proporsi	10% / 50%
7	*Able to estimate population parameters*	*Estimation and Distribution ofSampling*	*Interactive LectureDiscussion (CID)* *Exercise*	*150 minutes*	*Observation Test Classroom activity (TOA)* *Task 5*	*a. Can estimate the average of one population and the difference between two populations* *b. Can Estimating variance and difference of two variances*	*10% / 50%*

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						d. Can estimate the proportion and difference of two proportions	
8	**ETS**						
9-10	6. Mampu menguji parameter suatu populasi	Estimasi dan Distribusi Sampling	Ceramah Interaktif Diskusi (CID) Latihan Soal	300 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 6	a. Dapat menguji rata-rata satu populasi b. Dapat menguji varians satu populasi c. Dapat menguji proporsi satu populasi	10% / 60%
9-10	*Able to test parameters of a population*	*Estimation and Distribution of Sampling*	*Interactive Lecture Discussion (CID)* *Exercise*	*300 minutes*	*Classroom Activity* *Observation Test (TOA)* *Task 6*	*a. Can test the average of a population* *b. Can test the variance of a population* *d. Can test the proportion of a population*	*10% / 60%*
11-12	7. Mampu membandingkan parameter 2 populasi: Rata-Rata, Varians, Proporsi	Pengujian rata-rata, varians, dan proporsi pada satu populasi	Ceramah Interaktif Diskusi (CID) Latihan Soal	300 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 7	a. Dapat menaksir rata-rata satu populasi dan selisih dua populasi b. Dapat menaksir varians dan selisih dua varians c. Dapat menaksir proporsi dan selisih dua proporsi	20% / 70%

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11-12	*Be able to compare parameters of 2 populations: Mean, Variance, Proportion*	*Testing means, variance, and proportion on one population*	*Interactive Lecture Discussion (CID)* *Exercise Questions*	*300 minutes*	*Observation Test Classroom activity (TOA)* *Task 7*	*a. Can estimate the average of one population and the difference between two populations* *b. Can estimating variance and difference of two variances* *d. Can estimate the proportion and difference of two proportions*	*20% / 70%*
13	8. Mampu menguji perbedaan rata-rata lebih dari 2 populasi: Analisis Varians	Analisis Varians (ANOVA)	Ceramah Interaktif Diskusi (CID) 1. Latihan Soal	150 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 8	a. Dapat menjelasakan *variability within treatment* dan *variability between treatment* b. Dapat menghitung MSE, MSTr, dan MST c. Dapat menyusun tabel Analisis Varians (ANOVA)	10% / 80%
13	*Able to test the average difference of more than 2 populations: Analysis of Variance*	*Analysis of Variance (ANOVA)*	*Interactive Lecture Discussion (CID)* *Exercise*	*150 minutes*	*of Activity Observation Test in class (TOA)* *Assignment 8*	*a. Can explain variability within treatment and variability between treatment* *b. Can calculate MSE, MSTr, and MST* *d. Can compile Variance Analysis table (ANOVA)*	*10% / 80%*

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14-15	9. Mampu membuat model hubungan antara 2 variabel (respon dan prediktor)	Estimasi dan Distribusi Sampling	Ceramah Interaktif Diskusi (CID) Latihan Soal	300 menit	Tes Observasi Aktifitas di kelas (TOA) Tugas 9	a. Dapat menghitung korelasi dan interpretasi b. Dapat membuat model regresi sederhana (1 prediktor) c. Dapat menguji parameter regresi d. Dapat menentukan kebaikan (*goodness of fit*) suatu model regresi	20% / 100%
14-15	*Able to model the relationship between 2 variables (responses and predictors)*	*Estimation and Sampling Distribution*	*Interactive Lecture Discussion (CID)* *Exercise*	*300 minutes*	*Classroom Activity Observation Test (TOA)* *Task 9*	*a. Can calculate correlation and interpretation* *b. Can make simple regression models (1 predictor)* *c. Can test regression parameters* *d. Can determine the goodness (goodness of fit) of a regression model*	*20% / 100%*
16	**EAS**						

PUSTAKA/*REFERENCES*:

1. Johnson, R.A. and Bhattacharyya, G.K., *Statistics: Principles and Concepts*, 7th edition, John Wiley and Sons, New York, 2014.
2. Walpole, R. E., Myers, R.H., Myers, S.L., and Ye, K.E., *Probability and Statistics for Engineers and Sciences*, 9th edition, Prentice Hall, Boston, 2012.
3. Freedman, D., Pisani, R., and Purves, R., *Statistics*, 4th edition, W. W. Norton & Company, 2007.
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