MODULE HANDBOOK

INTRODUCTION TO STATISTICAL METHOD

STATISTICS UNDERGRADUATE PROGRAM
DEPARTMENT OF STATISTICS
FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER
SURABAYA

ENDORSEMENT PAGE

	MODULE HANDBOOK **INTRODUCTION TO STATISTICAL METHOD** **STATISTICS UNDERGRADUATE PROGRAM** **DEPARTMENT OF STATISTICS** **INSTITUT TEKNOLOGI SEPULUH NOPEMBER**

Proses *Process*	Penanggung Jawab *Person in Charge*			Tanggal *Date*
	Nama *Name*	Jabatan *Position*	Tanda tangan *Signature*	
Perumus *Preparation*	Dr. Vita Ratnasari, M.Si	Dosen Lecturer		
Pemeriksa dan Pengendalian *Review and Control*	Erma Oktania P. M.Si;Dr. Agnes Tuti Rumiati;Dr. Ismaini Zain ; Dr. Vita Ratnasari. M. Si; Prof. Dr. Muhammad Mashuri, MT	Tim kurikulum Curriculum team		
Persetujuan *Approval*	Prof. Dr. I Nyoman Budiantara, M.Si	Koordinator RMK Course Cluster Coordinator		
Penetapan *Determination*	Dr. Kartika Fithriasari, M.Si	Kepala Departemen Head of Department		

MODULE HANDBOOK
MATRICES

Module name	INTRODUCTION TO STATISTICAL METHOD	
Module level	Undergraduate	
Code	SS234103	
Course (if applicable)	INTRODUCTION TO STATISTICAL METHOD	
Semester	1	
Person responsible for the module	Dr. Vita Ratnasari. M. Si	
Lecturer	Erma Oktania P. M.Si;Dr. Agnes Tuti Rumiati;Dr. Ismaini Zain ; Dr. Vita Ratnasari. M. Si; Prof. Dr. Muhammad Mashuri, MT	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergradute degree program, mandatory, 1th semester.	
Type of teaching, contact hours	Case Method (53,84%) Other SCL Methods (46,16%)	
Workload	1. Lectures [L]: 3 x 50 = 150 minutes per week. 2. Exercises and Assignments [EA] : 3 x 60 = 180 minutes (3 hours) perweek. 3. Independent learning [IL] : 3 x 60 = 180 minutes (3 hours)per week.	
Credit points	3 credit points (sks), equivalent to 4.8 ECTS	
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 Apply statistical and mathematical theoretical knowledge in the interpretation and presentation of data CLO.2 Identify, formulate, and analyze data with appropriate statistical methods CLO.3 Evaluate the problem according to the hypothesis testing procedure CLO.4 Able to make the right decisions based on analysis of information and data, and able to communicate the results of the analysis both orally and in writing	PLO-4 PLO-5 PLO-5 PLO-7 PLO-9 PLO-5 PLO-7 PLO-9 PLO-5 PLO-7 PLO-9
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
Assessment and its weight	Quiz I–25% Midterm Exam – 25% Quiz II–25% Final Exam– 25%
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom
Reading list	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. 4. Anderson, A., *Statistics for Big Data*, For Dummies Publisher, 2015. 5. Ang, A.H-S. and Tang, W.H., *Probability Concepts in Engineering: Emphasis on Applications to Civil and Environmental Engineering*, 2nd edition, John Wiley and Sons, New York, 2007.

	INSTITUT TEKNOLOGI SEPULUH NOPEMBER **FAKULTAS SAINS DAN ANALITIKA DATA** **PROGRAM STUDI SARJANA STATISTIKA** **DEPARTEMEN STATISTIKA**	**Kode Dokumen**

RENCANA PEMBELAJARAN SEMESTER
SEMESTER LEARNING PLAN

MATA KULIAH (MK)/ *Course*	**KODE/** *Code*	**Rumpun MK/** *Course Group*	**BOBOT (sks)/** *Weight (Credit)*		**SEMESTER/** *Semester*	**Tgl Penyusunan/** *Drafting Date*
PENGANTAR METODE STATISTIKA/ *INTRODUCTION TO STATISTICAL METHOD*	SS234103	SOSPEN	**T=3**	**P=0**	I	17 Desember 2022

OTORISASI/ *AUTHORIZATION*	**Pengembang RPS/** *RPS Developer*	**Koordinator RMK/** *Course Group Coordinator*	**Ketua PRODI/** *Head of Department*
	Erma Oktania P. M.Si; Dr. Agnes Tuti Rumiati;Dr. Ismaini Zain ; Dr. Vita Ratnasari. M. Si; Prof. Dr. Muhammad Mashuri, MT	Prof. I Nyoman Budiantara, M.Si	Santi Wulan P, M.Si, Ph.D

Capaian Pembelajaran (CP)/ *Learning Achievement*	**CPL-PRODI yang dibebankan pada MK / *PLO***	
	CPL-4	Mampu menerapkan sains dan Matematika untuk mendukung pemahaman metode statistika
	CPL-5	Mampu menerapkan teori statistika pada metode statistika
	CPL-7	Mampu menggunakan perangkat komputasi modern untuk menyelesaikan permasalahan statistik
	CPL-9	Mampu menerapkan metode statistika untuk menganalisis permasalahan teoritis dan rill
	PLO-4	*Able to apply science and mathematics to support the understanding of statistical methods*
	PLO-5	*Able to apply statistical theory to statistical methods*
	PLO-7	*Able to use modern computing devices to solve statistical problems*
	PLO-9	*Able to apply statistical methods to analyze theoretical and real problems*
	Capaian Pembelajaran Mata Kuliah (CPMK) */CLO*	

CPMK.1 Menerapkan pengetahuan teori statistika dan matematika dalam interpretasi dan penyajian data
CPMK.2 Mengindentifikasi, memformulasi, dan menganalisis data dengan metode statistika yang tepat
CPMK.3 Mengevaluasi masalah sesuai prosedur pengujian hipotesis
CPMK.4 Mampu mengambil keputusan yang tepat berdasarkan analisis informasi dan data, serta mampu mengkomunikasikan hasil analisis baik secara lisan maupun tertulis

CLO.1 Apply statistical and mathematical theoretical knowledge in the interpretation and presentation of data
CLO.2 Identify, formulate, and analyze data with appropriate statistical methods
CLO.3 Evaluate the problem according to the hypothesis testing procedure
CLO.4 Able to make the right decisions based on analysis of information and data, and able to communicate the results of the analysis both orally and in writing

Matrik CPL – CPMK
PLO-CLO Matrix

CLO	PLO-4	PLO-5	PLO-7	PLO-9
CLO.1	V	V		
CLO.2		V	V	V
CLO.3		V	V	V
CLO.4		V	V	V

Deskripsi Singkat MK/ ***Course Description***

Pengantar Metode Statistika merupakan mata kuliah yang menunjang Capaian Pembelajaran Lulusan (CPL) prodi, yaitu: CPL-4, CPL-5, CPL-7, dan CPL-9. Setelah mengikuti mata kuliah ini, mahasiswa diharapkan mampu memformulasikan masalah ke dalam permasalahan statistika dan menganalisis data tersebut. Metode pembelajaran yang digunakan adalah kuliah tatap muka, diskusi, dan latihan soal. Tugas diberikan secara mandiri dan penilaian dilakukan melalui aktifitas di kelas dan ujian tertulis.

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

Bahan Kajian: Materi Pembelajaran/ ***Course Material***

Dasar Sains, Teori Statistika, Deskripsi dan Eksplorasi, serta Pemodelan
Basic Science, Statistical Theory, Description and Exploration, and Modeling

Pustaka/ **Utama/** ***Primary***

References	1. Johnson, R.A. and Bhattacharyya, G.K., *Statistics: Principles and Concepts*, 7th edition, John Wiley and Sons, New York, 2014. **Pendukung/ *Secondary*** 1. 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. 2. Freedman, D., Pisani, R., and Purves, R., *Statistics*, 4th edition, W. W. Norton & Company, 2007. 3. Anderson, A., *Statistics for Big Data*, For Dummies Publisher, 2015. 4. Ang, A.H-S. and Tang, W.H., *Probability Concepts in Engineering: Emphasis on Applications to Civil and Environmental Engineering*, 2nd edition, John Wiley and Sons, New York, 2007.
Dosen Pengampu/ *Lecturers*	Erma Oktania Permatasari, M.Si; Dr. Agnes Tuti Rumiati; Dr. Ismaini Zain; Dr. Vita Ratnasari
Matakuliah syarat/ *Pre-requisite Course*	-

Mg Ke- ***Week***	**Kemampuan akhir tiap tahapan belajar (Sub-CPMK)** ***Final capability for each learning step***	**Penilaian** ***Evaluation***		**Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa,** **[Estimasi Waktu]** **Learning Format Learning Methods Assignment for Student [Estimated Time]**		**Materi Pembelajaran** **[Pustaka]** ***Learning Material [References]***	**Bobot Penilaian (%)** ***Evaluation Weight (%)***
		Indikator ***Indicator***	**Kriteria & Bentuk** ***Criteria and Format***	**Luring (*offline*)**	**Daring (*online*)**		
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
1-2	Mampu menyajikan data dan	a. Dapat menghitung ukuran pemusatan data (rata-rata,	Tes Observasi Aktifitas di kelas (TOA) Tugas 1	Ceramah Interaktif Diskusi (CID) Latihan Soal		Pengertian konsep-konsep dalam Statistika: populasi, sampel,	10%

	memberikan interpretasi informasi dari sekelompok data *Able to present data and provide. interpretation of information from a group of data*	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).	*Classroom Activity Observation Test (TOA) Task 1*	*Interactive Lecture Discussion (CID) Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		parameter, Statistik deskriptif *Understanding the concepts in Statistics: population, sample, parameters, Descriptive statistics*	
3	Mampu menghitung ekspektasi (rata-rata) dan varians suatu variabel random *Able to calculate expectation (average) and variance of a random variable*	a. Dapat menghitung peluang suatu kejadian dan menerapkan Teorema Bayes b. Dapat merumuskan fungsi diskrit (pmf) dan fungsi kontinyu (pdf) *a. Can calculate the probability of an event and apply Bayes'Theorem* *b. Can formulate Discrete functions(pmf) and continuous functions (pdf)*	Tes Observasi Aktifitas di kelas (TOA) Tugas 2 *Classroom Activity Observation Test (TOA) Task 2*	Ceramah Interaktif Diskusi (CID) Latihan Soal **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		Fungsi peluang *Probability Function*	10%
4-5	Mampu menghitung peluang variabel random diskrit	a. Dapat mengidentifikasi distribusi diskrit: Binomial, Binomial	Tes Observasi Aktifitas di kelas (TOA)	Ceramah Interaktif Diskusi (CID) Latihan Soal		Fungsi Distribusi Diskrit *Discrete Distribution Function*	10%

	Be able to calculate odds of discrete random variables	Negatif, Geometrik, Hipergeometrik dan Poisson b. Dapat menghitung peluang kejadian berdasarkan distribusi diskrit tersebut . *a. Can identify discrete distributions: Binomial, Binomial Negative, Geometric, Hypergeometric and Poisson* *b. Can calculate the probability of events based on the discrete distribution*	Tugas 3 *Classroom Activity Observation Test (TOA) Task 3*	*Interactive Lecture Discussion (CID) Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**			
6	Mampu menghitung peluang variabel random kontinyu *Able to calculate the probability of Continuous random variables Continuous*	a. Dapat menghitung kejadian berdasarkan distribusi Normal dan distribusi Eksponensial b. Dapat menjelaskan Teorema Limit Central a. *Can count events based on Normal distribution and Exponential distribution* b. *Can be described Assume Central Limit Theorem*	Tes Observasi Aktifitas di kelas (TOA) Tugas 4 *Classroom Activity Observation Test (TOA) Task 4*	Ceramah Interaktif Diskusi (CID) Latihan Soal *Interactive Lecture Discussion (CID) Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		Fungsi Distribusi Kontinyu *Continuous Distribution Function*	10%
7	Mampu menaksir	a. Dapat menaksir rata-rata satu	Tes Observasi	Ceramah Interaktif Diskusi (CID)		Estimasi dan Distribusi Sampling	10%

	parameter populasi *Able to estimate population parameters*	populasi dan selisih dua populasi b. Dapat menaksir varians dan rasio dua varians c. Dapat menaksir proporsi dan selisih dua proporsi. *a. Can estimate the average of one population and the difference between two populations* *b. Can Estimating variance and difference of two variances* c. *Can estimate the proportion and difference of two proportions*	Aktifitas di kelas (TOA) Tugas 5 *Classroom Activity* *Observation* *Test (TOA)* *Task 5*	Latihan Soal *Interactive Lecture Discussion (CID) Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		*Estimation and Distribution of Sampling*	
8	**ETS**						
9-10	Mampu menguji parameter suatu populasi *Able to test parameters of a population*	a. Dapat menguji rata-rata satu populasi b. Dapat menguji varians satu populasi *c.* Dapat menguji proporsi satu populasi *a. Can test the average of a population* *b. Can test the variance of population* *c. Can test the proportion of a population*	Tes Observasi Aktifitas di kelas (TOA) Tugas 6 *Classroom Activity* *Observation* *Test (TOA)* *Task 6*	Ceramah Interaktif Diskusi (CID) Latihan Soal *Interactive Lecture Discussion (CID) Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		Pengujian rata-rata, varians, dan proporsi pada satu populasi *Testing means, variance, and proportion on one population*	10%
11-12	Mampu membandingkan parameter 2	a. Dapat menguji selisih rata-rata	Tes Observasi Aktifitas di	Ceramah Interaktif Diskusi (CID) Latihan Soal		Pengujian rata-rata, varians, dan proporsi pada dua populasi	15%

	populasi: Rata-Rata, Varians, Proporsi *Be able to compare parameters of 2 populations: Mean, Variance, Proportion*	dua populasi b. Dapat menguji rasio varians dua populasi c. Dapat menguji selisih dua proporsi . *d. Can estimate the average of one population and the difference between two populations* *e. Can estimating variance and difference of two variances* *f. Can estimate the proportion and difference of two proportions*	kelas (TOA) Tugas 7 *Classroom Activity* *Observation* *Test (TOA)* *Task 7*	*Interactive Lecture* *Discussion (CID)* *Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		*Testing means, variance, and proportion on two population*	
13	Mampu menguji perbedaan rata-rata lebih dari 2 populasi: Analisis Varians *Able to test the average difference of more than 2 populations: Analysis of Variance*	*a.* Dapat menjelasakan *variability within treatment* dan *variability between treatment* *b.* Dapat menghitung MSA, MSW, dan MST *c.* Dapat menyusun tabel Analisis Varians (ANOVA) *a. Can explain variability within treatment and variability between treatment* *b. Can calculate MSE, MSTr, and MST* *c. Can compile Variance Analysis*	Tes Observasi Aktifitas di kelas (TOA) Tugas 8 *Classroom Activity* *Observation* *Test (TOA)* *Task 8*	Ceramah Interaktif Diskusi (CID) Latihan Soal *Interactive Lecture* *Discussion (CID)* *Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		Analisis Varians (ANOVA) *Analysis of Variance (ANOVA)*	10%

		table (ANOVA)					
14-15	Mampu membuat model hubungan antara 2 variabel (respon dan prediktor) *Able to model the relationship between 2 variables (responses and predictors)*	*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 *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*	Tes Observasi Aktifitas di kelas (TOA) Tugas 9 *Classroom Activity Observation Test (TOA) Task 9*	Ceramah Interaktif Diskusi (CID) Latihan Soal *Interactive Lecture Discussion (CID) Exercise* **TM: 3x50"** **PT: 3x60"** **BM: 3x60"**		Regresi Linier Sederhana *Linear Regression*	15%
16	**Evaluasi Akhir Semester / Ujian Akhir Semester**						