MODULE HANDBOOK DESCRIPTION

Module designation	Probability and Statistics	
Code	FBS1214	
Semester(s) in which the module is taught	2 / first year	
Person responsible for the module	Agung Budi Muljono, ST., MT.	
Language	Indonesian	
Relation to curriculum	Compulsory for all Majors	
Teaching methods	Lectures, small group discussion, case base method	
Workload (incl. contact hours, self-study hours)	Contact minutes every week, each week of the 16 Weeks / semester: • Lectures: 2×50 minutes. • Exercises and Assignments: 2×60 minutes. • Self-learning: 2×60 minutes. total study hours = 5 hours 40 minutes/week	
Credit points	2 SKS (~ 3.6 ECTS)	
Required and recommended prerequisites for joining the module	Calculus I (FBS1104)	
Module objectives/intended learning outcomes	1. Students are able to understand the meaning and benefits of statistics, deductive and inferential statistics, determine types of data, characteristics of data, identify the level of measurement of data, represent the data in accordance with the characteristics and level of measurement.	PLO2
	2. Students are able to able to calculate and measure central tendency (Mean, Median, Mode), measure of data spread (Variance and Standard Deviation.	PLO2

	3. Students are able to understand probability theory and calculate probability, understand permutations, combinations, explain the concept of conditional probability, the number of probability theorem and Bayes' rule.	PLO2
	4. Students understand the random variables, probability distributions, and joint probability distributions, calculate joint and conditional probabilities, analyze Binomial, Poisson, and Normal distributions and approach discrete variables into continuous variables	PLO2
	5. Students are able to determine the sampling technique that is suitable for the population size and the desired data	PLO3
	6. Students are able to determine the number of sample groups based on desired experiments and calculate interval estimates for averages or proportions according to the data obtained.	PLO3
	7. Students are able to explain definitions & formulate hypothesis testing, apply hypothesis testing to averages and variances.	PLO3
	8. Students are able to determine the relationship between two or more variables.	PLO3
	9. Students are able to understand the linear relationship between two variables, explain parameter estimation using the least squares method. Understand simple linear correlation analysis, single forecast, understand simple non-linear regression.	PLO8

Content	1. Introduction to statistics, the benefits of statistics, descriptive statistics vs. inferential statistics, types of data, frequency distribution, measures of concentration and dispersion. 2. Set theory, probability concepts, sample spaces, events, calculating sample points and events, permutations, combinations, calculating probabilities, independent events, separate events with conditional probability, 3. The properties of discrete and continuous random variables, as well as the properties of the distribution of discrete and continuous random variables, the probability distribution function, the marginal distribution function, the conditional distribution function, mathematical expectation. 4. Theory of sampling, the mean confidence interval, the mean difference, a proportion, the difference in proportions, a variance, the ratio of the two variances. 5. Test the hypothesis of mean, difference of means, a proportion, and difference of proportions, a variance, and ratio of two variances. 6. Simple linear regression and correlation analysis.
Examination forms	- Written case study - Written and oral project study - Essay midterm and final test
Study and examination requirements	The final grade in the module is composed of; a. Case I assessment: 10 % b. Case II assessment: 10 % c. Case III assessment: 10 % d. Written Midterm assessment: 30 % e. Written Final assessment: 40 % Students must have a final grade of 65% or higher to pass

Reading list	1. Walpole, R.E. 1988, Ilmu Peluang dan Statistik untuk Insinyur dan Ilmuwan (diterjemahkan leh R.K. Sembiring dan Suroso) dari buku Probability and Statistics for Engineers and Scientist, Cetakan ke 2, Bandung: Penerbit ITB. 2. Jay L. Devore, 2012, Probability and Statistics for Engineering and the Sciences, Eighth Edition, Brooks/Cole 20 Channel Center Street Boston, MA 02210 USA. 3. William M. Mendenhall, Terry L. Sincich, Nancy S. Boudreau, 2016, Statistics for Engineering and the Sciences, Sixth Edition Student Solutions Manual, Publisher:CRC Press, Boca Raton 4. Spiegel, Murray R,2004, "Schaum's Outlines: Probabilitas dan Statistik (Edisi 2)", Erlangga, Jakarta