	Universitas Brawijaya **Faculty of Mathematics and Natural Sciences** **Department of Statistics / Bachelor Statistics Study Programme**

Module Handbook		
Module Name:	Multivariate Analysis I (MAS62123)	
Module Level:	Bachelor	
Abbreviation, if applicable:	-	
Sub-heading, if applicable:	-	
Courses included in the module, if applicable:	-	
Semester/term:	6th / Third Year	
Module Coordinator(s):	Dr. Ir. Solimun, MS.	
Lecturer(s):	Dr. Ir. Solimun, MS.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Teaching format / class per week during semester:	2 × 50 minutes + 100 minutes laboratory session	
Workload:	1.67 hours lectures, 2 hours structural activities, 2 hours individual studies for 16 weeks + 1.67 hours laboratory session, 2 hours structural activities, 2 hours individual studies for 8 weeks and total 136 hours per semester 4.50 ECTS	
Credit Points:	3	
Requirements:	Mathematical Statistics (MAS62115), Matrices and Vector Spaces (MAS62113)	
Learning goals / competencies:	**General Competence (Knowledge):**	
	ILO1	The students are able to master basic scientific concepts and statistical analysis methods applied on computing, social science, humanities, economics, industry and life science.
	ILO2	The students are able to arrange and/or choose an efficient data collection/ data generated design that applies in surveys, experiments or simulations.
	ILO3	The students are able to manage, analyze, and complete the real case using statistical method on computing, social humanities, economics, industry and life science that helped by software, then present and communicate the results.
	ILO4	The students are able to master at least two statistical softwares, including based on open source.

	ILO5	The students are able to apply logical, critical, systematic, and innovative thinking independently when applied to science and technology that contain humanities values, based on scientific principles, procedures and ethics with excellent and measurable results.
	ILO6	The students are able to take appropriate decisions to solve the problems expertly, based on the information and data analysis.
	ILO7	The students are able to improve and develop a job networks, then supervise and evaluate the team's performance they lead.
	ILO8	The students are able to apply and internalize the spirit of independence, struggle, entrepreneurship, based on values, norms, and academic ethics of Pancasila in all aspects of life.
	Specific Competence:	
	M1	Students are able to explain the basic concepts in multivariate analysis and are able to determine the model (analysis) that fits the data (ILO1, ILO3, ILO5)
	M2	Students are able to use matrix algebra in presenting multivariate data (ILO2, ILO4, ILO5, ILO6)
	M3	Students are able to estimate parameters in normal multivariate (ILO1, ILO2, ILO5, ILO6, ILO7)
	M4	Students are able to group continuous data and are able to explain bivariate ANOVA, and multivariate ANOVA (ILO2, ILO4, ILO5, ILO6, ILO7, ILO8)
	M5	Students are able to determine the right statistics analysis method (ILO3, ILO5, ILO6, ILO7, ILO8)
Contents:	1	Basic concepts in multivariate analysis and determine the model (analysis)
	2	Matrix algebra in the presentation of multivariate data
	3	Parameter estimation in normal multivariate
	4	Group continuous data and be able to explain bivariate ANOVA and multivariate ANOVA
	5	The proper statistics analysis method
Soft skill attribute:	Responsible, independently, and discipline	
Study/exam achievement:	Final score (NA) is calculated as follow: 10% Assignments, 20% Laboratory Session, 30% Quizzes, 20% Midterm Exam, 20% Final Exam Final index is defined as follow: A : > 80 - 100	

	B+ : > 75 - 80 B : > 69 - 75 C+ : > 60 - 69 C : > 55 - 60 D+ : > 50 - 55 D : > 44 - 50 E : 0 - 44
Forms of media:	Software (MS Excel, R, SPSS), Laptop, LCD projector, whiteboard
Learning methods:	Lecture, assessments, and discussion
Literature:	Main:
	Johnson, R.A. and DW. Wichern, 2002. Applied Multivariate Statistical Analysis. Fifth edition. Prentice-Hall, Inc., New Jersey.
	Support:
	Anderson, T.W., 1984. An Introduction to Multivarite Statistical Analysis, John Wiley and sons, New York, 675.
	Mardia, K.V., J.T. Kent and J.M. Bibby, 1979. Multivariate Analysis. A Harcourt Science & Technology Company, San Diego.
	Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010). Multivariate Data Analysis, 7 th Edition. Prentice-Hall.
	A.C. Rencher, Methods of Multivariate Analysis, 2nd ed., 2002, Wiley Series in Probability & Statistics, Canada
	S. Sharma, Applied Multivariate Techniques, 1996, John Wiley & Sons, New York.
Notes:	