



Multivariate Analysis

Module name	Course Module
Module level	Undergraduate Programme
Code, if applicable	3115-215-3
Sub-title, if applicable	-
Courses, if applicable	Multivariate Analysis
Semester(s) in which the module is taught	Semester 5, 6, or 7
Person responsible for the module	Lecturer of course
Lecturer(s)	7. Dra. Widyanti Rahayu, M.Si. 8. Qorry Meidianingsih, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	This course is an elective course and is offered starting in semester 5.
Type of teaching, contact hours	Teaching methods used in this course are: - Lecture (i.e. presentation of lecture material, group discussion, case-based learning) - Structured assignments (case studies) The class size for the lecture is 40 students. Contact hours for lecture is 40 hours.
Workload	Students are required to fulfill a minimum of 136 hours in one semester, which consists of: - 40 hours for lecture, - 48 hours for structured assignments, - 48 hours for self-study
Credit points	4,5 ECTS
Requirements according to the examination Regulations	Students should have attended all lectures and submitted all scheduled individual and group assignments prior to the final examination.
Recommended prerequisites	- Linear Algebra - Basic Statistics - Mathematical Statistics II



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UNIVERSITAS NEGERI JAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE

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Program intended learning outcomes	<p>Programmes Learning Outcome (PLO) that can be achieved with this course are:</p> <p>PLO 5 : Mastering the theoretical concept of mathematics, including mathematical logic, discrete mathematics, algebra, analysis and geometry, probability, and statistics.</p> <p>PLO 7 : Able to conduct, analyze, and apply research outcomes to improve the mathematics learning process.</p> <p>PLO 10 : Able to solve problems in real situations based on knowledge of mathematics education.</p> <p>The Course Learning Outcomes (CLO) to be achieved in this course are:</p> <p>CLO 1 : Able to understand aspects of multivariate analysis, such as meaning, purpose and various statistical techniques for analyzing multiple variable data.</p> <p>CLO 2 : Able to understand the characteristics of the normal multivariate distribution.</p> <p>CLO 3 : Able to determine hypothesis testing procedure of the average vector of one population based on Hotelling's T^2 statistics.</p> <p>CLO 4 : Able to understand and apply one way MANOVA and two way ANOVA.</p> <p>CLO 5 : Able to understand the concept and application of principal components and interpret the results.</p> <p>CLO 6 : Able to understand the concept and application of factor analysis and interpret the results.</p> <p>CLO 7 : Able to understand the use of discriminant analysis in classifying an observation.</p> <p>CLO 8 : Able to understand the differences between hierarchical and non-hierarchical cluster analysis.</p> <p>The relationship between PLO and CLO in this course is described as follows.</p>																																																	
	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="padding: 5px;">CLO</th> <th colspan="4" style="padding: 5px;">PLO</th> </tr> <tr> <th style="padding: 5px;">5</th> <th style="padding: 5px;">6</th> <th style="padding: 5px;">7</th> <th style="padding: 5px;">10</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="background-color: #cccccc;"></td> <td></td> <td style="background-color: #cccccc;"></td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">4</td> <td style="background-color: #cccccc;"></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">5</td> <td style="background-color: #cccccc;"></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">6</td> <td style="background-color: #cccccc;"></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">7</td> <td style="background-color: #cccccc;"></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td style="text-align: center; padding: 5px;">8</td> <td style="background-color: #cccccc;"></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> </tbody> </table>	CLO	PLO				5	6	7	10	1					2					3					4					5					6					7					8				
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Content	Students will learn about: 21. Aspects of Multivariate Analysis 22. The Multivariate Normal Distribution 23. Inferences about a mean vector 24. Comparisons of Several Multivariate Means 25. Principal Components 26. Factor Analysis 27. Discrimination and Classification 28. Clustering, Distance Methods and Ordination
Forms of Assessment	The components of assessment in learning consist of assignments (30%), mid-exams (35%), and final exams (35%).
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> • Study and examination requirements: <ol style="list-style-type: none"> 31. Students must be present 15 minutes before the lecture begins. 32. Students who do not attend more than 20% of the total meeting are considered failed in this course. 33. Students are not allowed to use communication tools for purposes that are not related to learning. 34. Students must submit all assignments before the deadline. 35. Students must take the exam to get the final grade. • Form of examination: written examination
Media employed	Computer/ personal laptop, internet, LCD, whiteboard, online learning platforms (Microsoft Teams/ Zoom, LMS), Microsoft Excel, and Microsoft Power Point.
Reading list	References: 10. Applied Multivariate Statistical Analysis. Fifth edition. Richard A. Johnson, Dean W. Wichern. Pearson Education International USA. 2002 11. Introduction to Multivariate Statistical Analysis. Anderson T. W. 2nd ed., John Wiley and sons inc., NY.