Experimental Design

Module name	Course Module
Module level	Undergraduate Programme
Code, if applicable	31152323
Sub-title, if applicable	-
Courses, if applicable	Experimental Design
Semester(s) in which the module is taught	Semester 5, 6, or 7
Person responsible for the module	Lecturer of course
Lecturer(s)	1. Vera Maya Santi, M.Si. 2. Qorry Meidianingsih, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Mata kuliah ini adalah mata kuliah pilihan dan ditawarkan mulai 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 structued 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	Basic Statistics

Program intended learning outcomes

Programmes Learning Outcome (PLO) yang dapat dicapai dengan mata kuliah ini yaitu:

PLO 5 : Mastering the theoretical concept of mathematics, including mathematical logic, discrete mathematics, algebra, analysis and geometry, probability, and statistics.
PLO 6 : Mastering in modeling mathematical concepts, linear programs, differential equations, dan numerical methods.
PLO 7 : Able to conduct, analyze, and apply research outcomes to improve the mathematics learning process.
PLO 10 : Able to solve problems in real situations based on knowledge of mathematics education.

The Course Learning Outcomes (CLO) to be achieved in this course are:

CLO 1 : Able to understand the basic principles of experimental design.
CLO 2 : Able to develop the basic concepts of statistics.
CLO 3 : Able to analyze data using a completely randomized design for single factor.
CLO 4 : Able to understand the procedures for conducting tests to separate the effects between treatments, between treatments and controls, or structured treatments.
CLO 5 : Able to understand the assumptions in the analysis of variance (ANOVA).
CLO 6 : Able to analyze data using a completely randomized design for two factors.
CLO 7 : Able to analyze data using a 2^k factorial design.
CLO 8 : Able to analyze data using a split-plot design.

The relationship between PLO and CLO in this course is described as follows.

CLO	PLO			
	5	6	7	10
1	■			
2	■	■		
3	■		■	■
4	■		■	■
5	■			
6	■		■	■
7	■		■	■
8	■		■	■

Content	Students will learn about: 1. Introduction of Experimental Design 2. Simple Comparative Experiments 3. Experiments with a Single Factor 4. Comparisons Among Treatment Means 5. Model Adequacy Checking 6. The Two-Factor Factorial Design 7. The 2^k Factorial Design 8. The Split-Plot Design
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	• Study and examination requirements: 11. Students must be present 15 minutes before the lecture begins. 12. Students who do not attend more than 20% of the total meeting are considered failed in this course. 13. Students are not allowed to use communication tools for purposes that are not related to learning. 14. Students must submit all assignments before the deadline. 15. 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: 1. Montgomery, D. C., 2013. *Design and Analysis of Experiments*. Eighth Edition. John Wiley & Sons. 2. Mattjik, A.A. & Sumertajaya, M., 2013. *Perancangan Percobaan dengan Aplikasi SAS dan MINITAB*. PT Penerbit IPB Press. 3. Steel, R. G. D. & Torrie, J. H., 1993. *Prinsip dan Prosedur Statistika. Suatu pendekatan biometrik*. PT. Gramedia Pustaka, Jakarta.