



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

Course	Course Name	:	<b>Design of Experiment</b>
	Course Code	:	SS234313
	Credit	:	3 SKS
	Semester	:	III

**COURSE DESCRIPTION**

The purpose of this course is making students able to design data collection through experiments and be able to analyze experimental data and interpret it. The theoretical material of various environmental designs and treatment designs is conveyed through lectures and discussions. Likewise, data analysis material is conveyed through discussion and discussion as well as practicum in class with and without software (software). In addition, students are given assignments, both independently and in groups, to identify the application of various designs to real problems, either by self-observation or through field studies at government agencies or industries where activities are available research and development. The purpose of this assignment is to train students to be able to manage and work in teams and to be responsible for the results of independent and group work.

**PROGRAM LEARNING OUTCOME**

- PLO-5 Able to apply statistical theory and statistical methods
- PLO-6 Able to design, collect, and perform data management with the right methodology
- 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

**COURSE LEARNING OUTCOME**

- CLO.1 Describes the use of experimental design concepts in data collection
- CLO.2 Can arrange experimental designs with one factor and completely randomized designs (CRD)
- CLO.3 Can analyze the comparison of treatment mean values with multiple comparison methods, and contrast, as well as tracing changes in response variables through orthogonal polynomial contrast and regression analysis
- CLO.4 Able to utilize science and technology to process experimental data
- CLO.5 Be able to construct a single-factor experimental design and complete randomized block design (RAKL), incomplete randomized block design, Latin square design (RBSL) and develop a two-factor experimental design
- CLO.6 Able to make the right decisions based on experimental results and able to communicate the results of the analysis both orally and in writing

**MAIN SUBJECT**

1. Review data collection for decision making needs
2. One factor design procedure with RAL

3. Multiple comparisons with LSD, HSD, Duncan, Newman Keuls test, Scheffe's methods
4. The one-factor design procedure with RAKL, including the method of randomizing the treatment of experimental units
5. Factorial design procedures, including methods of randomizing the treatment of experimental units
6. Basic concepts of  $2^k$  factorial experimental designs and randomization procedures with various environmental designs
7. Procedure for designing a nested experiment
8. Procedure for designing a split plot experiment
9. Experimental design problems in various cases

#### PREREQUISITE

Introduction to Statistical Method

#### REFERENCES

1. Montgomery, D.C, 2020. Design and Analysis of Experiments. 10th edition. New York: John Wiley dan Sons Inc.
2. Box, G.E.P, Hunter, W.G., and Hunter, J.S. 2005. Statistics for Experimenters an Introduction to Design: Data Analysis and Model Building. 5th edition. John Wiley dan Sons Inc.
3. Kuehl, R.O. Design of Experiments: Statistical Principles of Research Design and Analysis. 2nd edition. Duxbury Press.