



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

Course

Course Name	:	Numerical Analysis
Course Code	:	SS234204
Credit	:	3 SKS
Semester	:	II

COURSE DESCRIPTION

Numerical analysis is required if the analytical solution cannot be found in calculus topics, because the function is in the form of a close form. The numerical topic is a method of achieving an iterational approach to get the results. This iteration requires programming. To get learning achievements, learning methods consisting of: lectures, discussions, exercises, programming practicums, and tasks are required.

PROGRAM LEARNING OUTCOME

- PLO-4 Able to apply science and mathematics to support the understanding of statistical methods.
- PLO-5 Able to apply statistical theory to 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

COURSE LEARNING OUTCOME

- CLO.1 Able to use numerical or iterative concept in various calculus topics, namely calculation of: linear and nonlinear equation system solutions, interpolation, differential, optimization, integral, and differential equations.
- CLO.2 Able to compile MATLAB and Excel computer programs for numerical calculations.
- CLO.3 Able to calculate errors or errors and able to choose the right decision on the various numeric methods used.
- CLO.4 Able to model the relationship between quantitative response with quantitative predictors, as well as interpolate and extrapolate.
- CLO.5 Able to use numeric method for statistical modeling.
- CLO.8 Has professional responsibilities and ethics
- CLO.9 Able to motivate their self to think creatively and learn throughout life

MAIN SUBJECT

1. Numerical approach
2. Bisection, Regula Falsi, and Newton Rhapson
3. Solution for nonlinear equation using Newton Rhapson (OLS and Likelihood)
4. Solution for nonlinear equation using Gauss Naif Elimination, Gauss Jordan, and Gauss Seidel
5. Modeling, Interpolation, and Extrapolation
6. Integral function using Riemann Trapezium, and Simpson
7. Differential function
8. Nonlinear regression using Gauss Newton

9. Differential equation

PREREQUISITE

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REFERENCES

1. Chapra, S.C. and Canale, R.P., 2010. Numerical Methods for Engineer. 6th edition. New York: McGraw-Hill Companies.
2. Chapra, S.C. 2012. Applied Numerical Methods, with MATLAB for Engineers and Scientists. 3rd edition. New York : McGraw-Hill Companies.
3. Conte and Carl de Boor. 1995. Elementary Numerical Analysis : Algorithmic Approach. McGraw-Hill.
4. Thomas, King J., 1984. Introduction to Numerical Computation. McGraw-Hill.