Mata Kuliah (MK)	Course Name	: Numerical Methods
	Code	: EW184004
	Credits	: 3
	Semester	: V

Description of Course

This course is supposed to develop a basic understanding of numerical algorithms and skills for applying numerical algorithms to solve mathematical problems using computer programming. In this course, students learn about how to solve a mathematical problem using a numerical algorithm approach. Topics to be studied include errors, number representations, Taylor theorems, non-linear equations, linear equations, interpolations, regression, numerical integration, numerical derivatives and differential equations.

Learning Outcomes

KNOWLEDGE

(P02) Mastering the concepts and principles of engineering, and implementing them in the form of procedures for analysis and de sign in power systems, control systems, multimedia telecommunications, or electronics Mastering the concepts and principles of engineering, and implementing them in the form of procedures for analysis and design in power systems, control systems, multimedia telecommunications, or electronics

SPECIFIC SKILL

(KK01) Able to formulate engineering problems in power systems, control systems, multimedia telecommunications, or electronics.

GENERAL SKILL

(KU12) Able to implement information and communication technology (ICT) in the context of implementation of his/her work.

ATTITUDE

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently

(S12)Working together to be able to make the most of his/her potential.

Course Learning Outcomes

KNOWLEDGE

Mastering the concept of error, number representation, Taylor theorem, non-linear equations, linear equations, interpolations, regression, numerical integration, numerical derivatives and differential equations.

SPECIFIC SKILL

Able to apply numerical algorithms to perform error calculations, solve Taylor theorems, non-linear equations, linear equations, interpolations, regression, numerical integration, numerical derivatives and differential equations.

GENERAL SKILL

Able to apply programming languages or other tools for numerical algorithm implementation.

ATTITUDE

Demonstrate the attitude of being responsible for work in his area of expertise independently.

Working together to be able to make the most of his/her potential.

Main Subjects

1. Error Analysis, number representation, Taylor Theorem
2. Non linear equation
3. Linear equation
4. Regression
5. Interpolation
6. Numerical integration
7. Numeric Derivatives
8. Differential Equations

Reference(s)

[1] Greenbaum and T. P. Chartier. Numerical Methods: Design, Analysis and Computer Implementation of Algorithms. Princeton University Press, 2012.
[2] W. H. Press, S. A. Teukolsky, W. T. Vetterling, B. P. Flannery. Numerical Recipes: The Art of Scientific Computing. Cambridge University Press, 2007.
[3] L. R. Scott. Numerical Analysis. Princeton University Press, 2011.
[4] E. Suli, D. F. Mayers. An Introduction to Numerical Analysis. Cambridge University Press, 2003.

Prerequisite(s)

EW184002 Basic Programming
EE184304 Partial and Ordinary Differential Equations