HASAN KALYONCU UNIVERSITY
Faculty of Engineering
Course Description Form

COURSE: Numerical Analysis				
CODE: MATH214	**SEMESTER:** SPRING			
LANGUAGE: ENGLISH	**TYPE:** COMPULSORY			
PRE-REQUISITES:- **CO-REQUISITES:-**	**THEORY**	**PRACTICAL**	**CREDIT**	**ECTS**
WEEKLY HOURS:3	3	0	3	5

CONTENT OF THE COURSE:
Methods for finding Roots of Equations: The Intermediate Value Theorem, The Mean Value Theorem, The Rolle's Theorem, Taylor Series, Approximations and Errors, Bisection, Newton-Raphson Method, Lagrange polynomial interpolation, System of Non-linear Equations, System of Linear Algebraic Equations: Gauss Elimination, Matrix Inversion, Gauss-Seidel Iteration, Least Squares Regression, Polynomial Interpolation, Numerical Differentiation, Numerical Integration, Newton-Cotes Formulae, Romberg's and Gauss-Quadrature Integration, Solution of Ordinary Differential Equations, Euler, Runge-Kutta, Multi-Step Methods, Initial-Value Problems, Boundary-Value Problems

OBJECTIVE OF THE COURSE:
Enhancing problem solving skills: Numerical methods are extremely powerful problem-solving tools. Construction and use of numerical systems for solving a problem.

WEEKLY SCHEDULE	
Week	**Topics**
1	Methods for finding Roots of Equations: The Intermediate Value Theorem, The Mean Value Theorem, The Rolle's Theorem
2	Taylor Series, Approximations and Errors
3	Bisection Method
4	Newton-Raphson Method,
5	Lagrange Polynomial Interpolation
6	System of Non-linear Equations System of Linear Algebraic Equations: Gauss Elimination, Matrix Inversion, Gauss-Seidel Iteration
7	Least Squares Regression
8	Midterm
9	Numerical Differentiation
10	Numerical Integration, Newton-Cotes Formula
11	Romberg's and Gauss-Quadrature Integration
12	Solution of Ordinary Differential Equations
13	Euler, Runge-Kutta, Multi-Step Methods
14	Initial-Value Problems, Boundary-Value Problems

TEXTBOOK: Numerical Analysis , 9th ed., by Burden & Faires, edited by Brooks & Cole 2001.

REFERENCE BOOKS • Cheney W., Kincaid D., Numerical Mathematics & Computing (Edition 5), Brooks/Cole, 2004. (ISBN 0- 534-89993-7).

INSTRUCTOR(S):	Assoc. Prof. Dr. Ece Yetkin ÇELİKEL
FORM PREPARATION DATE:	02.03.2020

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
LO1	3	2	0	0	0	0	0	0	0	0	0
LO2	3	3	0	0	0	0	0	0	0	0	0
LO3	2	0	0	0	0	0	0	0	0	0	0
LO4	3	2	0	0	0	0	0	0	0	0	0
LO5	3	2	0	0	0	0	0	0	0	0	0
	PO: Program Outcomes | LO: Learning Outcomes Values: 0: None | 1: Low | 2: Medium | 3: High										

LEARNING OUTCOMES OF THE COURSE:

LO1: A comprehension of mathematics (algebra, differential, integration …) and fundamentals of science
LO2: Ability to apply knowledge of mathematics, science and engineering to problems in electronics engineering.
LO3: Ability to recognize the needs and challenges of our age and to assess the global and social impact of engineering solutions
LO4: Ability to identify, formulate and solve engineering problems.
LO5: Ability to effectively communicate knowledge and opinions via written, oral visual means.

CONTRIBUTION OF THE COURSE TO VOCATIONAL EDUCATION

With the help of this course, students gain advanced mathematics knowledge for solving complex problems that require numerical analysis in the field of engineering.