OSTİM TECHNICAL UNIVERSITY
INSTITUTE OF SCIENCES
AEROSPACE ENGINEERING
COURSE SYLLABUS
2022-2023 FALL

MATH301 Numerical Analysis Method

Course Name	Code	Semester	Theory (hour/week)	Application (hour/week)	Lab (hour/week)	Credits	ECTS
Numerical Analysis Method	MATH301	Fall	4	0	0	4	5

Course Language	English
Course Type	Compulsory
Course Level	Undergraduate
Mode of Delivery	Distance / in class lectures
Course Lecturer(s)	Prof. Dr. İsmail AVCIBAŞ
Teaching Methods and Techniques of the Course	Lectures, homework

Course Objectives

The aim of this course is to teach the student various topics in numerical analysis such as solutions of nonlinear equations, interpolation and curve fitting approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of differential equations for electrical and computer engineering.

Learning Outcomes

By the end of the course the student is expected to solve real-life and electrical engineering applications reflecting the student ability

- to recognize and apply appropriate theories, principles and concepts relevant to numerical analysis.
- to assess and evaluate the literature within the field of numerical analysis
- to analyze and interpret information from a variety of sources relevant to numerical analysis.
- to compare the computational methods for advantages and drawback, choose the suitable computational method among several existing methods, implement the computational methods using any of existing programming languages and compare between them.

to identify the suitable computational technique for a specific type of problems and develop the computational

Course Description

General overview on numerical methods, which are most frequently applied in the electrical and computer engineering with the solution of linear and nonlinear equations, interpolation, curve fitting, numerical differentiation, numerical integration, and numerical solution of partial differential equations. Applications of numerical methods for Electrical Engineering.

Subjects and Related Preparation Studies	
Week	**Subjects**
1	Course description, introduction
2	Solution of nonlinear equations
3	Solution of nonlinear equations
4	Solution of systems of linear equations
5	Solution of systems of linear equations
6	Interpolation and polynomial approximation, curve-fitting
7	Interpolation and polynomial approximation, curve-fitting
8	Midterm
9	Numerical differentiation
10	Numerical differentiation
11	Numerical integration
12	Numerical integration
13	Solution of partial differential equations
14	Solution of partial differential equations
15	Boundary value problems
16	Boundary value problems

Course Notes/Textbooks

S. Rosloniec, Fundamental Numerical Methods for Electrical Engineering, Springer, 2008 J. Kiusalaas, Numerical Methods in Engineering with Matlab, Cambridge University Press, 2018.
J.H. Mathews, K.D. Fink, Numerical Methods using Matlab, Pearson, 2004.
M.T. Heath, Scientific Computing: An Introductory Survey, SIAM, 2018.
T. Sauer, Numerical Analysis, Pearson 2017

Evaluation System		
Semester Activities	**Number**	**Weighting**
Participation		
Laboratory		
Application		
Field Work		

Portfolio		
Quizzes / Studio Critiques		
Homework / Assignments	5	30%
Presentation		
Project		
Report		
Seminar		
Midterm	1	30%
Final	1	40%
	Sum	**100 %**
Weighting of Semester Activities on the Final Grade		60 %
Weighting of End-of-Semester Activities on the Final Grade		40 %
	Sum	**100 %**

Course Category	
Core Courses	x
Major Area Courses	
Supportive Courses	
Media and Management Skills Courses	
Transferable Skill Courses	

Course Learning Outcomes And Program Qualifications Relationship							
No	**Program Competencies/Outcomes**	**Contribution Level**					
		1	**2**	**3**	**4**	**5**
1	Ability to apply knowledge of mathematics, science, and engineering					x
2	Ability to design and conduct experiments and to analyze and interpret experimental results.					
3	Ability to design a system, component, and process according to specified requirements.					
4	Ability to work in teams in interdisciplinary areas.					
5	Ability to identify, formulate and solve engineering problems.					x
6						

	Identifies, defines, formulates and solves complex network problems; chooses and applies analysis and modeling methods suitable for this purpose.					
7	Develops, selects and uses modern techniques and tools necessary for the analysis and solution of complex problems encountered in Electrical and Electronics Engineering applications; uses required technologies effectively.					x

ECTS / Workload Table

Semester Activities	**Number**	**Duration (Hours)**	**Workload**
Theoretical Course Hours (Including exam week: 16 x total hours)	16	4	64
Laboratory			
Application			
Portfolio			
Field Work			
Study Hours Out of Class			
Presentation			
Project			
Reports			
Homework/Assignments	5	4	20
Quizzes / Studio Critiques			
Midterms	1	20	20
Final Exam	1	20	20
Total	**(AKTS 124/25 = 4.96)**		**124**