NUMERICAL ANALYSIS

1	Course Title:	NUMERICAL ANALYSIS	
2	Course Code:	EEM4107	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	7	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Dr. Ögr. Üyesi ESİN KARPAT	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	Dr. Öğr. Üye. Esin KARPAT Mühendislik Fakültesi Elektrik-Elektronik Mühendisliği Bölümü Ofis:320 0.224.294 20 20	
17	Website:		
18	Objective of the Course:	This course is designed to introduce engineering students to the numerical solutions of mathematical problems occurring in engineering and to improve their computer skills.	
19	Contribution of the Course to Professional Development:	Students gain the ability to solve complex engineering problems that cannot be solved analytically, via numerical methods.	
20	Learning Outcomes:		
		1	Have an understanding of importance and fundamentals of numerical methods and their most important mathematical properties.
		2	Develop an understanding of the computer implementation of these numerical methods to solve fundamental and practical engineering problems and develop programming skills
		3	Have the ability of the efficient use of existing software packages developed for engineering analyses
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21	Course Content:		
	Course Content:		
Week	Theoretical		Practice

1	Overview of numerical methods, their potential and limitations, computers and problem formulation. Approximations and errors.	
2	Solution of the systems of linear equations, Direct methods: Gaussian elimination, Gauss Jordan elimination, and LU. Applications and exercises	
3	Iterative methods for linear systems, simple iteration, Gauss-Seidel , relaxation.	
4	Linear Independence, system condition, ill-conditioned equations, matrix inversion, Roots of Equations, linear interpolation. Applications and exercises	
5	Newton-Raphson and Secant methods . Systems of nonlinear equations, Newton method	
6	Finite differences and Interpolating polynomials	
7	Lagrange interpolation. Applications and exercises.	
8	Basic statistics, Curve fitting. Least-squares and linear regression. Nonlinear and multi variable regression.	
9	Numerical differentiation. Applications and exercises.	
10	Numerical differentiation. Applications and	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	2.00	28.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	20.00	20.00
Others	0	0.00	0.00
Final Exams	1	30.00	30.00
Total Work Load			140.00
Total work load/ 30 hr			4.00
ECTS Credit of the Course			4.00

differential equations. Initial and boundary value problems. Single step methods for

expansion method,

12 Euler's method. Applications and exercises

ordinary differential equations.

14 High order ordinary differential equations and differential equation systems.

22 Textbooks, References and/or Other

İrfan Karagöz, Vipaş yayı., 2001

2. Numerical Methods for Engineers

3. Numerical Methods for Engineers and Scientists, J. Hoffman; McGraw-Hill,1993

23 Assesment

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00

Contribution of Final Exam to Success Grade	60.00
Total	100.00
Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa uludag University Associate and Undergraduate Education Regulation.

24 ECTS / WORK LOAD TABLE

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**