NUMERICAL ANALYSIS

1	Course Title:	NUMERICAL ANALYSIS	
2	Course Code:	END3031	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	3	
6	Semester:	5	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	2.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	1	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. NURSEL ÖZTÜRK	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	nursel@uludag.edu.tr +90 224 2942083 Uludağ Üniversitesi, Endüstri Mühendisliği Bölümü	
17	Website:		
18	Objective of the Course:	The objective of the course is to learn the numerical analysis methods	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Will be able to understand the solutions for nonlinear and linear systems, regression, interpolation, numerical integration, numerical differentiation methods
		2	Will be able to solve the Engineering problems using the numerical methods
		3	Will be able to use numerical analysis software
		4	
		5	
		6	
		7	
		8	
		9	
		10	
21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Introduction to Numerical Analysis, Error analysis	
2	The solution of nonlinear equations-Bracketing Methods (Graphical methods, The Bisection Method, The False-Position Method)	MATLAB and Numerical Methods Toolkit

3	The solution of nonlinear equations-Open Methods (Simple fixed point iteration, The Newton-Raphson Method	MATLAB and Numerical Methods Toolkit
4	The solution of nonlinear equations (The Secant Method, Multiple roots)	MATLAB and Numerical Methods Toolkit
5	Linear algebraic equations (Motivation, Gauss Elimination, Pitfalls of elimination methods, Techniques for improving solutions, Determinant with Gauss elimination)	MATLAB and Numerical Methods Toolkit
6	Linear algebraic equations (Gauss-Jordan, The matrix inverse, The solution vector with Gauss-Jordan and matrix inverse)	MATLAB and Numerical Methods Toolkit
7	Linear algebraic equations (LU Decomposition, LU Decomposition version of Gauss elimination-Doolittle, Crout decomposition, The matrix inverse with the LU decomposition)	MATLAB and Numerical Methods Toolkit
8	Linear algebraic equations (Cholesky decomposition, Gauss-Seidel method, Jacobi iteration, Convergence criterion for the Gauss-Seidel, Relaxation)	MATLAB and Numerical Methods Toolkit
9	Repeating courses and midterm exam	
10	Least-squares regression, Linear regression, Non-linear regression and linearization, Polynomial regression, Multiple linear regression	MATLAB and Numerical Methods Toolkit
11	Interpolation (Newton's divided-difference	MATLAB and Numerical Methods Toolkit
13	Numerical Integration (The Trapezoidal Rule, Simpson's Rules, Integration of unequal segments, Romberg integration)	MATLAB and Numerical Methods Toolkit
14	Numerical Differentiation	MATLAB and Numerical Methods Toolkit
22	Textbooks, References and/or Other	S.C. Chapra and R.P. Canale, "Numerical Methods for
23	Midterm Exams	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	14	1.00	14.00
Self study and preperation	12	4.00	48.00
Homeworks	5	5.00	25.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm Exams	1	2.00	2.00
Others	1	1.00	1.00
Final Exams	1	2.00	2.00
Total Work Load			120.00
Total work load/ 30 hr			4.00
ECTS Credit of the Course			4.00

Midterm Exam	1	40.00
Quiz	2	10.00
Home work-project	5	0.00
Final Exam	1	50.00
Total	8	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

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	4	4	0	4	0	0	0	4	5	0	0	0	0	0	0	0
ÖK2	4	4	0	4	0	0	0	4	5	0	0	0	0	0	0	0
ÖK3	0	0	0	4	0	0	0	4	5	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**				