



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Applied Numerical Methods							
Course Code		MME527		Couse Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	200 (Hours)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Teaching advanced level of Numerical mathematical methods							
Course Content		Introductory concepts, finding the roots of nonlinear equations of one independent variable, Liner system of equations, Nonlinear system of equations (roots of system of equations), Optimization, Curve fitting, Numerical Differentiation and Integration, Ordinary Differential Equations, Eigen value problem.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)		Lec. Orçun EKİN							

### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	15
Final Examination	1	60
Quiz	1	15
Assignment	5	5
Term Assignment	1	5

### Recommended or Required Reading

1	Chapra, S., 2006,. Numerical methods for engineers 4th edition McGraw-Hill Book
2	Burden R.L., Faires J. D. 2011, Numerical Analysis 9th edition Brooks/Cole Cengage Learning
3	M. Turhan Coban, "Numerical Analysis with java examples"

Week	Weekly Detailed Course Contents	
1	Theoretical	Introductory concepts, Programming languages, Plotting, Taylor series applications
2	Theoretical	Finding the roots of non linear equations of one independent variable
3	Theoretical	Linear system of equations
4	Theoretical	Non linear system of equations (roots of system of equations)
5	Theoretical	Optimization
6	Theoretical	Optimization
7	Theoretical	Numerical Differentiation and Integration
8	Intermediate Exam	Midterm Exam
9	Theoretical	Numerical Differentiation and Integration
10	Theoretical	Ordinary Differential Equations
11	Theoretical	Ordinary Differential Equations
12	Theoretical	Eigenvalue problem
13	Theoretical	Applied sample problem solutions
14	Final Exam	Final Exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Practice	14	0	3	42
Assignment	13	0	2	26
Laboratory	12	0	6	72
Individual Work	14	0	4	56
Midterm Examination	1	0	2	2



Final Examination	1	0	2	2
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = ECTS				8
*25 hour workload is accepted as 1 ECTS				

### Learning Outcomes

1	Assessment of pre-knowledge of programming languages
2	Assessment of knowledge about linear and non-linear equations
3	Ability to utilize numerical differentiation and integration
4	Learning numerical analysis techniques
5	Application of numerical analysis techniques in computer environment

### Programme Outcomes (Mechanical Engineering (English) Master)

1	To be able to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study
2	To be able to complete and implement "limited or incomplete data" by using the scientific methods
3	To be able to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them
4	To be able to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process
5	To be able to gain comprehensive information on modern techniques, methods and their borders which are being applied to engineering
6	To be able to design and apply analytical, modeling and experimental based research, analyze and interpret the faced complex issues during the design and apply process
7	To be able to gain high level ability to define the required information and data
8	To be able to work in multi-disciplinary teams and to take responsibility to define approaches for complex situations
9	To be able to transfer of the process and results of studies at national and international environments systematic and clear verbal or written
10	To be able to be aware of social, scientific and ethical values guarding adequacy at all professional activities and at the stage of data collection, interpretation, and announcement
11	To be able to become aware of new and developing application of profession and ability to analyze and study on those applications
12	To be able to interpret engineering application's social and environmental dimensions and it's compliance with the social environment

### Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	4	5	5	4	5
P2	5	5	5	5	4
P3	4	5	5	4	3
P4	5	4	4	3	4
P5	5	3	3	4	4
P6	5	4	3	5	3
P7	3	4	4	4	5
P8	3	5	3	3	5
P9	3	5	4	5	4
P10	4	4	5	4	5
P11	5	3	5	5	5
P12	5	5	5	5	5

