AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Advanced Engineering Mathematics								
Course Code	EEE503		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	To help engineering students complete their mathematical background necessary in graduate level researches.								
Course Content	Ordinary differential equations and differential equation systems, series solution of ordinary differential equations (power series method, Legendre and Bessel equations, Frobenius method), Laplace transform, applications of engineering problems, Fourier Analysis and partial differential equations, Fourier Series, partial differential equations and Fourier series solutions, wave and heat equations, complex analysis, complex integration, complex numbers and functions, power series, conformal mapping, conformal transformations								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Demonstration, Discussion, Case Study, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	30
Assignment	4	20
Project	1	20

Recommended or Required Reading	
1	Erwin Kreyszig, Advanced Engineering Mathematics Seventh Edition, Wiley (2006)
2	W.E. Boyce & R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems Eighth Edition, (2005).
3	Lecturer’s lecture Notes

Week	Weekly Detailed Course Contents	
1	Theoretical	Homogenous and non-homogenous, constant coefficient ordinary differential equations
2	Theoretical	Systems of differential equations and their solutions
3	Theoretical	Science&Engineering applications of ordinary differential equations and systems of ordinary differential equations (forced oscillatory motion, R-L-C circuits, and circuit systems)
4	Theoretical	Infinite series and convergence tests
5	Theoretical	Power series, Taylor series and Binomial expansions
6	Theoretical	Orthogonal functions and Legendre equation, Power series solutions, method of Frobenius, Legendre polynomials, Associated Legendre polynomials, spherical harmonics, science&engineering applications
7	Theoretical	Orthogonal functions and Bessel equation, Bessel functions, modified Bessel functions, science&engineering applications
8	Intermediate Exam	Midterm Exam
9	Theoretical	General study of other special differential equations: Laguerre, Hermite, Gegenbauer, Chebyshev, and Gauss equations.
10	Theoretical	Sturm-Liouville theory and eigenvalue problems
11	Theoretical	Integral transformations, Fourier series, Fourier and Laplace transform and their science&Engineering applications
12	Theoretical	Introduction to the theory of complex functions, complex numbers, conformal mapping, Schwartz-Kristoffel transformations
13	Theoretical	General study of other special differential equations: Laguerre, Hermite, Gegenbauer, Chebyshev, and Gauss equations.
14	Theoretical	Sturm-Liouville theory and eigenvalue problems
15	Theoretical	Integral transformations, Fourier series, Fourier and Laplace transform and their science&Engineering applications

16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	3	98
Assignment	4	10	3	52
Project	1	11	3	14
Midterm Examination	1	15	3	18
Final Examination	1	15	3	18
			Total Workload (Hours)	200
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To be able to formulize and solve physical problems
2	To be able to construct mathematical relations and analyze the results
3	To be able to understand the mathematical methods used in engineering applications.
4	To be able to discuss the mathematical methods used in engineering applications.
5	To be able to apply the mathematical methods used in engineering applications.

Programme Outcomes *(Electrical and Electronics Engineering Master)*	
1	Developing and intensifying knowledge that requires expertise in the area of Electrical-Electronics Engineering, and gaining the skills necessary to analyze and solve problems using this knowledge
2	Grasping the inter-disciplinary interaction related to Electrical-Electronics Engineering, interpreting and forming new types of knowledge by combining the knowledge from Electrical-Electronics Engineering and the knowledge from various other disciplines
3	Developing new approaches to solve the complex problems arising in Electrical-Electronics Engineering, coming up with solutions while taking responsibility and carrying out a specific study independently
4	Assessing the knowledge and skill gained in the area of Electrical-Electronics Engineering with a critical view
5	Transferring the current developments and one’s own work in Electrical-Electronics Engineering, to other groups in written, oral and visual forms
6	The ability to control the collecting, interpreting, practicing and announcing processes of the Electrical-Electronics Engineering related to data taking into consideration scientific, cultural and ethical values and the ability to teach these values to others
7	Developing application plans concerning the subjects related to Electrical-Electronics Engineering and the ability to evaluate the end results of these plans within the frame of quality processes

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	4	5	5
P2	5	5	4	5	5
P3	4	5	4	4	4
P4	4	4	5	4	4
P5	5	4	5	4	4
P6	4	5	4	4	4
P7	4	4	4	4	4