

ADVANCED ENGINEERING MATHEMATICS

1	Course Title:	ADVANCED ENGINEERING MATHEMATICS	
2	Course Code:	MAK5001	
3	Type of Course:	Compulsory	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
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:	Prof. Dr. MURAT REİS	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	reis@uludag.edu.tr	
17	Website:	https://www.youtube.com/watch?v=xzwwv8HxFrY&list=PLsxmiXTQvQn_RwSszpm2nARgRDVs01sqU	
18	Objective of the Course:	To learn advanced mathematical methods used in solving engineering problems.	
19	Contribution of the Course to Professional Development:	This course contributes to the student's ability to analyze and solve engineering problems.	
20	Learning Outcomes:		
		1	Students taking this course learn advanced math topics and methods.
		2	They can model engineering problems and solve them using mathematical methods.
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	
1	Review of ordinary differential equations.		
2	Ordinary differential equations engineering applications		
3	Series solutions of differential equations. Frobenius method.		

4	Special differential equations. Bessel and modified Bessel differential equations and series solutions. First and second order classical and modified Bessel functions.	
5	Legendre differential equation and Legendre polynomials.	
6	General expansion theorem. Orthogonality and completeness. Orthogonal functions.	
7	Fourier series. Fourier integrals and Fourier transform.	
8	Laplace transform	
9	Partial differential equations. Equation extraction in engineering problems. One dimensional wave equation. D'Alembert solution.	
10	Method of Separation of variables. Initial and boundary value problems. Eigenvalue problems. Eigenvalues and eigenfunctions. Theory of vibration and examples of heat transfer	
11	Serial solutions. Classification of second order partial differential equations. Elliptic, hyperbolic and parabolic equations. Characteristic curves.	
12	Calculus of variations. Variations. Variation problems in integral form. Euler-Lagrange equation.	

Activites			Number	Duration (hour)	Total Work Load (hour)
22	Theory	Continuity and derivative in complex functions. Analytics. Cauchy-Riemann conditions.	14	3.00	42.00
	Practicals/Labs		0	0.00	0.00
22	Self study and preparation		12	12.00	144.00
	Textbooks, References and/or Other		Differential Equations for Engineers and Scientists, Yunus		
	Homeworks		0	0.00	0.00
23	Assesment		0	0.00	0.00
	Projects		0	0.00	0.00
	Field Studies		0	0.00	0.00
	Midterm Exam	0	0	0.00	0.00
	Others		0	0.00	0.00
	Final Exams	0	1	1.00	1.00
	Home work-project	0	0	1.00	1.00
	Total Work Load				187.00
	Total work load/ 30 hr	1	100.00		6.23
	ECTS Credit of the Course				6.00
Success Grade					
Contribution of Final Exam to Success Grade			100.00		
Total			100.00		
Measurement and Evaluation Techniques Used in the Course			Absolute evaluation is used.		
24	ECTS / WORK LOAD TABLE				

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ÖK2	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contrib ution Level:	1 very low		2 low		3 Medium		4 High		5 Very High							