



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Analytical Methods in Engineering							
Course Code		MCE501		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	7	Workload	175 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		The objectives of this course are to enable the students to understand analytical solution methods for linear ordinary and partial differential equations. This course will enable graduate students to solve Bessel, Gamma,Laguerre functions and Legendre polynomials.							
Course Content		Ordinary differential equations. Series solutions of ordinary differential equations. Method of Frobenius. Fourier series. Boundary conditions. Partial differential equations. Seperation of variables. Bessel, Gamma,Laguerre functions. Legendre polynomials.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Case Study, Individual Study, Problem Solving					
Name of Lecturer(s)		Prof. Selman SAĞLAM							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	2	40
Final Examination	1	40
Assignment	4	20

Recommended or Required Reading

1	P.V. O'Neil, Advanced Engineering Mathematics, 7. Ed.,Cengage Learning, 2010.
2	F.B. Hildebrand, Advanced Calculus for Applications, 2. Ed.,Prentice-Hall,1976
3	C.R. Wylie,Differential Equations, McGraw-Hill, 1979

Week	Weekly Detailed Course Contents	
1	Theoretical	Elementary Methods for solution of ordinary differential equations
2	Theoretical	Elementary Methods for solution of ordinary differential equations
3	Theoretical	Series solutions of ordinary differential equations
4	Theoretical	Series solutions of ordinary differential equations
5	Theoretical	Method of Frobenius
6	Theoretical	Fourier Series
7	Theoretical	Boundary Conditions
8	Intermediate Exam	Midterm Exam
9	Theoretical	Partial Differential Equations
10	Theoretical	Partial Differential Equations
11	Theoretical	Seperation of variables
12	Theoretical	Seperation of variables
13	Theoretical	Seperation of variables
14	Theoretical	Special functions
15	Theoretical	Special functions
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	2	3	70
Assignment	4	0	4	16
Midterm Examination	2	25	3	56



Final Examination	1	30	3	33
Total Workload (Hours)				175
[Total Workload (Hours) / 25*] = ECTS				7
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	be able to find analytical solutions of linear ordinary differential equations
2	be able to find analytical solutions of partial differential equations
3	be familiar with Fourier series
4	be able to solve Bessel, Gamma, Laguerre functions
5	be familiar with Legendre polynomials

Programme Outcomes (Civil Engineering Master)

1	To be able to develop expertise knowledge in a Civil engineering area founded on their graduate competence.
2	To be able to use the theoretical and practical expertise knowledge gained in their specialty area.
3	To be able to use the information, problem solving and / or practical skills from the field, in interdisciplinary studies.
4	To be able to create new knowledge by integrating their knowledge area with the knowledge coming from different disciplines; and solve problems that need expertise by using scientific research methods
5	To be able to solve the problems related to his/her area by using appropriate research methods
6	To be able to devise a problem in their specialty area, develop a solution methodology, solve the problem, and interpret the results and take action if necessary
7	To be able to criticize the knowledge in their specialty area, guide the learning process, and independently direct high level studies
8	To be able to systematically communicate the recent developments in their specialty area and their own studies to groups both inside and outside their specialty area, orally, in writing and visually
9	To be able to use computer software at a level required by their specialty area with drawing upon information and communication technology at a high level
10	To be able to introduce scientific, technological, social and cultural advancements in the field of civil engineering and to contribute to the process of being an information of the society and to sustain it.
11	To be conscious of professional and ethical responsibility and contribute to the establishment of this consciousness.
12	To be able to protect social, scientific, and ethical values during collection, interpretation, and dissemination stages of the data associated with their specialty area; instruct and supervise these values
13	To be able to use at least one foreign language in a level to follow current developments related to the field.

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	5	4	5	4	5
P2	4	5	4	5	4
P3	5	4	4	4	5
P4	4	5	5	5	4
P5	5	4	4	4	5
P6	4	5	5	5	4
P7	5	4	4	4	5
P8	4	5	5	5	4
P9	5	4	4	4	5
P10	4	5	5	5	4
P11	5	4	4	5	5
P12	4	5	5	5	4
P13	5	4	4	4	5

