



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Analytical Methods in Engineering							
Course Code		MME623		Course Level		Third Cycle (Doctorate Degree)			
ECTS Credit	9	Workload	229 (<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)									

Assessment Methods and Criteria

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

Recommended or Required Reading

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	Separation of variables
12	Theoretical	Separation of variables
13	Theoretical	Separation 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	15	5	3	120
Assignment	4	1	4	20
Midterm Examination	2	25	3	56
Final Examination	1	30	3	33
Total Workload (Hours)				229
[Total Workload (Hours) / 25*] = ECTS				9

*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 (*Mechanical Engineering (English) Doctorate*)

1	1. In Mathematics, natural sciences and mechanical engineering, department has the sufficient infrastructure; the ability to use the theoretical and practical information for engineering solutions
2	2. The ability to identify, define, and solve the formula for complex engineering problems; the ability to select and apply for the appropriate analytical methods and modelling techniques
3	3. To meet desired needs of a system, system component, or process, analysing and designing skill under realistic constraints; in this respect, the ability to apply the methods of modern design
4	4. The ability to use and choose modern techniques and tools for required engineering applications and; the ability to use information technology effectively
5	5. The ability to design the experiment, collect the data for the experiment and interpret to analysing results
6	6. The ability to use computer software and hardware information, access to information and other information sources
7	7. The ability to work individually and with multidisciplinary teams effectively, taking responsibility self-confidence for complex situations
8	8. The ability to communicate with foreign colleagues by having high level of foreign language knowledge in the field of engineering
9	9. Monitoring the science and technology developments and the ability to renew itself with innovative ideas constantly
10	10. Professional and ethical responsibility awareness
11	11. Having an adequate information and awareness in the subjects of occupational safety, occupational health, social security rights, quality control and management issues of environmental protection
12	12. The ability to appreciate the effects of engineering solutions and applications in universal and social dimensions
13	13. The ability to be enlightened to the experts or non-expert audience groups on the issues related with engineering problems and solutions written and oral
14	14. The ability to have adequate knowledge and skills in the project development and application, manage the activities planning, including the projects to the employees having the responsibility of the project by increasing vocational awareness

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

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

