



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Mathematical Modelling							
Course Code		MTK525		Couse Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	200 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		This course aims to acquaint students with the basic knowledge of numerical solution of some kinds of integral equations and ODEs. Students will be familiar with classification of equations Volterra and Fredholm method of solutions. They may easily understand the features of topics used at the area of information other courses. They will be able to make applications related to biology, and other sciences.							
Course Content		Introduction to mathematical modelling, Linear and non-linear differential equations, Population and logistic equations, Time depend phenomena, Harvesting and toxicity, Time depend phenomena with integral term							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	50
Assignment	1	20

Recommended or Required Reading

1	Paul Davis, (1999), Differential Equations : Modeling with MATLAB, Prentice Hall.
2	G. A Turskey, F. Yuan, D. K. Katz, (2004), Tranport Phenomena in Biological Systems
3	S. M. Dunn, A. Constantides, P. V. Moghe, (2006) Numerical methods in Biomedical Engineer, Academic press.

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to mathematical modelling
2	Theoretical	Applications in real life
3	Theoretical	Finite difference methods for ODEs,
4	Theoretical	Finite difference methods for PDEs
5	Theoretical	Numerical solution and stability of differential equations
6	Theoretical	Cauchy- Riemann equations
7	Theoretical	Local truncation errors
8	Intermediate Exam	Midterm exam
9	Theoretical	Linear and non-linear differential equations
10	Theoretical	Population and logistic equations
11	Theoretical	Harvesting and toxicity
12	Theoretical	Time depend phenomena
13	Theoretical	Toxicity term via integral terms
14	Theoretical	Time depend phenomena with integral term
15	Theoretical	Time depend phenomena with integral term
16	Final Exam	FINAL EXAM

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	1	20	2	22
Midterm Examination	1	40	2	42



Final Examination	1	50	2	52
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 comprehend the real life problems.
2	To be able to comprehend Population and logistic equations
3	To be able to write numerical programming.
4	To be able to comprehend time depend phenomena.
5	To be able to develop analytical skills and apply to problems

Programme Outcomes (Mathematics Master)

1	To be able to have an adequate theoretical and practical domain knowledge.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use theoretical and practical domain knowledge gained in the field of Mathematics.
4	To be able to interpret knowledge from different disciplines integrating knowledge in the field of mathematics and produce new information.
5	To be able to define, analyse, model and to solve the problems by scientific methods in Mathematics.
6	To be able to conduct a math related specialistic study independently.
7	To be able to develop new strategic approaches to solve problems occurred in unforeseen and complex math-related applications by taking responsibility.
8	To be able to lead in situations that require solving problems related to the mathematics.
9	To be able to criticize his/her knowledge and skills acquired in the field mathematics.
10	To be able to transfer his/her ideas and suggestions for solutions to problems by supporting quantitative or qualitative data verbally and in writing.
11	To be able to communicate both orally and written in a foreign language.
12	To be able to use computer hardware and information technologies with software required by Mathematics.
13	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and being able to support the development of social, scientific, cultural and ethical values.
14	To be able to develop mathematics-related strategies, policies and operational plans, and to evaluate the results obtained within the framework of quality processes.
15	To be able to use his/her knowledge in the field of mathematics and practical problem-solving skills in interdisciplinary studies.

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	3	4	4	4	4
P2	3	4	4		
P3	3	4	4	4	4
P4	3	4	4		
P5		4	4		
P7		4	4		
P12	3			5	4
P15	4	4	4	3	4

