



MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2017-2018 Fall

MATH2055 Differential Equations

COURSE DESCRIPTION FORM

Offering Department	Department of Computer Engineering		Undergraduate must course				
Course Code	MATH2055						
Course Name	Differential Equations						
Language of Instruction	English						
ECTS	5						
Contact Hours	Theoretical (T): 3	Practice (U): 0		Laboratory(L): 2			
Pre-requisites	MATH1001 Calculus I						
Instructor	Name	Vail KARAKALE					
	E-mail	vail.karakale@marmara.edu.tr					
Course Materials	Mandatory	Introduction to Ordinary Differential Equations (4th Edition), by S.L. Ross, Wiley 1989					
	Recommended	Differential Equations, by S.L. Ross, Wiley 1984. Elementary Differential Equations and Boundary Value Theorems, by W. Boyce and R. C. DiPrima, Wiley 2008					
Course Objectives	The aim of this course is to provide the basic theory of ordinary differential equations and to provide necessary tools for solving the problems modeled by differential equations and their applications.						
Course Content	<p>Definition and classification of differential equations. Initial-Value and Boundary-Value Problems. First order differential equations - Exact differential equations. Integrating factors. Second- and higher-order differential equations - Variation of parameters. The Cauchy-Euler equation. The Laplace Transform. The Inverse Transform. The Convolution. The Laplace Transform. Solution of linear differential equations. Linear differential equations. Differential operators. Systems of linear differential equations in normal form. Matrices and vectors. Series solutions of linear differential equations. Power series solutions. Series solutions of linear differential equations. The method of Frobenius.</p>						
Learning Outcomes	LO1	Develop mathematical models for some systems in real life in engineering.					
	LO2	Define and solve differential equation.					
	LO3	Solve first- and second-order ordinary differential equations with appropriate methods for a set of given boundary conditions or initial conditions.					
	LO4	Use Laplace Transform to solve differential equations.					
	LO5	Solve differential equations by using power series.					
	LO6	Solve systems of differential equations.					
Program Outcomes		LO1	LO2	LO3	LO4	LO5	LO6
PO10	Knowledge of mathematics, science (a) and computer engineering (b)sufficient knowledge of specific issues(1); ability to use theoretical and practical knowledge in complex engineering problems and in these areas(2).	1a,2	1a,2	1a,2	1a,2	1a,2	1a,2
PO12	Information on advanced mathematics, including differential equations (a), integral calculus (b), linear algebra (c), statistic and probability (d), and discrete mathematics (e).	a	a	a	a	a	a
Subjects (Knowledge, Skills and Behaviours), Contributions of Subjects to Learning Outcomes, Assessment Methods	No	Week	Subjects				
	K1	1	Classification of Differential Equations				
	K2	2	DD Solutions in Initial and Boundary Conditions				
	K3	3-4	First-Order Differential Equations				
	K4	5	Modeling with First-Order Differential Equations				
	K5	6-7	Second-Order Differential Equations				
	K6	8	The Euler Equation				
	K7	9-10	The Laplace Transform				
	K8	11	Modelling with Second-Order Differential Equations				
	K9	12	Higher-Order Differential Equations				
	K10	13	Series Solutions				
K11	14	Systems of Differential Equations					
Assessment Methods and Weights	No	Type	Weight	Implementation Rule		Make-up Rule	
	MF	Midterm-Final	79%	There are one project, one midterm and one final exam. Exams will be closed books and notes. Use of a calculator is allowed.		When a medical report or letter of appointment in accordance with the university procedure is submitted, a make-up exam is given for a maximum of one midterm exam.	

					The make-up exam for the final exam is given in the make-up exam week.										
	Q	Quiz													
	H	Homeworks													
	P	Projects	21%	-											
	R	Reports													
	P	Presenattion													
	A	Attendance													
	L	Class/ Laboratory/ Field Work													
	O	Others													
	TOTAL		100%												
Determining Letter Grades	<ul style="list-style-type: none"> The letter grade will be determined based on one project, one midterm and one final exam. In order to pass the course, the final score and the total average score of the student must be at least 50. 														
	<table border="1"> <tr> <td>Assessment</td> <td>Midterm</td> <td>Homework-Project</td> <td>Final</td> <td>TOTAL</td> </tr> <tr> <td>Weight</td> <td>39</td> <td>21</td> <td>40</td> <td>100</td> </tr> </table>					Assessment	Midterm	Homework-Project	Final	TOTAL	Weight	39	21	40	100
	Assessment	Midterm	Homework-Project	Final	TOTAL										
Weight	39	21	40	100											
Teaching Method, Student Work Load	Time Applied by the Instructor														
	No	Method	Explanation		Hours										
	1	Lectures	Lectures are given in class using the board or via presentations. Example questions are solved to enhance the concepts.		14x3=42										
	2	Problem Session/ Practice	Problems related to the course topics are solved on the board.												
	3	Laboratory	Experiments are done in the laboratory or theoretical concepts covered during the lectures are practiced using computer exercises.												
	4	Interactive Courses	Questions are asked to students during lectures and they are encouraged to guess the answers (peer learning is also in this category)												
	5	Field Work	Students attend activities outside the campus.												
	6	Midterm	Midterm exam is given during the midterm week.		2										
	7	Final	Final exam is given during the final exam week.		2										
	Estimated Time to be Allocated by a Student														
	8	Projects	The students carry out research about the problem given in the project, design and implement their solution and prepare a report.												
	9	Homeworks	The students solve the problems given as homework.		14x4=56										
	10	Pre-class learning of Course Material	The students study and learn the new subjects from course materials.												
11	Review of Course Material	Students review the course subjects from course materials to prepare for the exams and homeworks.		14x2=28											
12	Office Hour	Students ask questions to the instructor or the assistant during office hours.													
TOTAL				130											
Academic Honesty	Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.														
	In case academic dishonesty is observed, the first authority is the instructor of the course. The instructor may decide to give the student zero for the homework(s)/lab(s)/exam(s), give the letter grade FF, or may take disciplinary action.														