

MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2020-2021 Spring

MATH2059 Numerical Methods

COURSE DESCRIPTION FORM

						ION FC	/ I XIVI					
Offering Departn	Department of Computer Engineering Undergraduate must course (4th semester)											
Course Code												
Course Name		Numerio	al Method	ls								
Language of		English										
Instruction												
ECTS		4										
Contact Hours		Theoreti	ical (T): 3	Practice (U): 0		La	boratory(L):	0			
Pre-requisites		MATH10	001 Calcu	lus I								
Instructor/Assistant		Instruct	or	Prof. Dr. Çiğdem Eroğlu Erder	n	cigdem.erd	lem@marm	ara.edu.tr				
		Assista	nt	Serap Korkmaz	serap.ko	rkmaz@ma	armara.edu.	<u>tr</u>				
Course Materials		Mandat	ory	S. C. Chapra, R. P. Canale, Numerical Methods for Engineers, 7th edition, McGraw Hill, 2015 S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, 3rd Edition, McGrawHill, 2012. The course materials, assignments and announcements are shared via the course web page: https://classroom.google.com// Class code: 076m5g6								
				Please visit the above link and click on the plus sign at top right corner to join the class using the class code.								
		Recommended R. L. Burden and J. D. Faires, Numerical Analysis					rooks/Cole,	2011.				
Course Objectives		The objective of this course is to introduce basic numerical methods and their applications in engineering. Students who complete the course will have gained the knowledge and skills to analyze the engineering problems they face and apply numerical methods in an effective way.										
Course Content		Solution	of system	ATLAB programming. Floating pons of linear equations. Introduction intention and integration. Solution	n to optimiz	zation. Reg	ression and	interpolation	n. Curve fit			
Learning Outcomes		LO1 Use the MATLAB programming language and toolboxes to implement numerical algorithms.										
		LO2 Solve nonlinear equations with a single unknown using numerical methods.										
		LO3 Solve systems of linear equations using numerical methods.										
		LO4 Apply basic optimization concepts using numerical methods.										
		LO5	LO5 Apply regression and interpolation methods to fit curves to data in engineering applications.									
		LO6										
Program Outcon	nes				LO1	LO2	LO3	LO4	LO5	LO6		
PO1		and com to the re theoretic	nputer eng levant dis cal and ap	dge in mathematics, science (a) gineering subjects (b) pertaining cipline (1); ability to use plied information in these areas e engineering problems (2).		1.a		1.a	1.a			
PO4		Ability to techniqu	devise (a les and to (1); ability	a), select, and use (b) modern ols needed for engineering v to employ information	1.b 2							
	PO12		gies ellec	ctively (2).	_							
PO12		including (a), linea	dge of adv g different ar algebra	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability nathematics (d).			b			а		
PO12	No	including (a), linea	dge of adv g different ar algebra	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability nathematics (d).	LO1	LO2	b LO3	LO4	LO5	a LO6		
	No S1	including (a), linea (c), and	dge of adv g different ar algebra discrete n	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability nathematics (d).	LO1	LO2		LO4	LO5			
Subjects (Knowledge,		including (a), linea (c), and Week	dge of adv g different ar algebra discrete n Subject Introduc	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability nathematics (d). s tion to numerical methods B programming		LO2		LO4	LO5			
Subjects (Knowledge, Skills and	S1	including (a), linea (c), and Week 1	dge of adv g different ar algebra discrete n Subject Introduc MATLAE Floating represer	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability nathematics (d). s tion to numerical methods B programming point arithmetic: Computer ntation; error analysis	LO1	LO2		LO4	LO5			
Subjects (Knowledge, Skills and Behaviours), Contributions of Subjects to Learning	S1 S2	including (a), linear (c), and Week 1 2-3	dge of adv g different ar algebra discrete n Subject Introduc MATLAE Floating represer Solution a single Regula I Methods Converge	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability nathematics (d). s tion to numerical methods B programming p point arithmetic: Computer nation; error analysis of nonlinear equations with unknown: Bisection and Falsi Methods; Fixed Point s; Newton, Secant Methods; ence analysis.	LO1 MF, H, Q	LO2 MF, H,Q		LO4	LO5			
PO12 Subjects (Knowledge, Skills and Behaviours), Contributions of Subjects to Learning Outcomes, Assessment Methods	\$1 \$2 \$3	including (a), linear (c), and Week 1 2-3 4-5	dge of adv g different ar algebra discrete n Subject Introduc MATLAE Floating represer Solution a single Regula I Methods Converg	ranced mathematics subjects ial equations, integral calculus (b), statistics and probability mathematics (d). s tion to numerical methods B programming point arithmetic: Computer mation; error analysis unknown: Bisection and Falsi Methods; Fixed Point s; Newton, Secant Methods; ence analysis. linear systems of equations: n elimination; pivotting; LU	LO1 MF, H, Q	MF,		LO4	LO5			

				on; constrai	ned linear						
			optimization Regression	on. on: linear re	egression;						
	S 7	10	polynomia regressior	l regressior ነ	r; multivariate					MF,H,Q	
	S8	11-12	Divided di		nge polynomials, subic splines,					MF,H,Q	
	S9				ion and integration						MF,H, Q
	S10	14	Differentia	l equations							MF, Q
Assessment Methods and Weights	No	Туре		Weight	Weight Implementation Rule			Make-up Rule			
	MF	Midterm, Final		%70	There will a midterm and a final exam. Exams will be closed boks and notes. Calculators are allowed. Marmara University reg followed for make-up exam					-	will be
	Q	Quizzes		%30	lowest quiz grade will not be taken i	There will be at least 3 quizzes. The lowest quiz grade of each student - will not be taken into account.					
	Н	Homeworks			There will be 3 MATLAB based homeworks. Late submissions will - be penalized.						
	TOTA	\L		%100							
Determining Letter Grades	 The letter grades will be determined based on the midterm and final exams, quizzes and homeworks. In order to determine the letter grade, a curve or catalog based method will be followed based on the total average scores of the students. The final exam score and the total average score of the student must be at least 35 to pass the course. According to Marmara University Undergraduate regulations, the weight of the final exam must be at least 40 out of 100. 										
	Assessment Midtern		n Exam	Attendance- Quizzes Quizzes (Polls via Zoom)			Final Exam		TOTAL	TOTAL	
	We	eight	3	0	10	20		40		100	
	Time		y the Instru	·							
	No	Method		Explanat							Hours
Teaching Method, Student Work Load	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 Practice	n Session/	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)						0	
	5	Field W		Students attend activities outside the campus.							
	6	Ara Sına	av	Midterm exam is given during the midterm week.							2
	7				Final exam is given during the final exam week.						2
	Estimated Time to be Allocated by a Student										
	8	Poject		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.							3x5=15
	10	Pre-clas of Cours Material		The students study and learn the new subjects from course materials.							
		Review	of Course	Students review the course subjects from course materials to prepare for the exams and homeworks.							36
	11	Material		the exam:	s and homeworks.					1	
	11 12	Material Office H	<u> </u>	<u>.</u>	s and homeworks. ask questions to the	instructor or the	he assis	tant during	office hours		2
		Office H	<u> </u>	<u>.</u>		instructor or tl	he assis	stant during	office hours	-	2 99
Academic Honesty	12 TOTA Violati facilita or wor	Office H L ions of sc ating acts of the control o	lour holastic hol of dishonest sly used with	Students nesty includ y by others nout informin		ted to cheating d possession tampering with	g, plagi of exan	arizing, fabi ninations, su ademic work	ricating info Ibmitting wo	rmation or rk of anothe udents.	99 citations, er person