

## COURSE DESCRIPTION FORM

<b>Course Code and Title</b>	CE445 COMPUTER PROGRAMMING IN CIVIL ENGINEERING		
<b>Semester</b>	7		
<b>Catalog description</b>	Introduction to MATLAB. Simple mathematical operations in Matlab, expressions and variables, matrices. Algorithm and program development with MATLAB. MATLAB advanced topics. Numerical integral and derivative. Programming for solution of truss systems.		
<b>Required reading</b>	1. William J Palm, "Introduction to MATLAB for Engineers". 3 <sup>rd</sup> Ed., McGraw Hill, 2011		
<b>Recommended reading</b>	1. S.R. Otto and J.P. Denier, "An Introduction to Programming and Numerical Methods in MATLAB", Springer, 2005 2. W.F. Carrol, "A Primer for Finite Elements in Elastic Structures", John Wiley and Sons, 1999		
<b>ECTS</b>	4		
<b>Prerequisites and co-requisites</b>	No prerequisite. Required attendance to lectures is at least 70% of total term hours.		
<b>Compulsory/Elective</b>	Technical elective course		
<b>Language of instruction</b>	English		
<b>Aim of course</b>	To gain the ability to perform computer programming in civil engineering problems.		
<b>Learning outcomes of the course unit</b>	1. Uses basic MATLAB functions 2. Create an algorithm for the problems 3. Write a program in computer environment		
<b>Mode of delivery</b>	The mode of delivery of this course is face to face and is carried out in the laboratory using a computer.		
<b>Course content</b>	1. Introduction to basic algorithms and programming 2. Algorithm, flow diagram, pseudo code preparation 3. MATLAB environment, and basic functions 4. Matrix operations, script and function creation, looping, logical operators 5. Creating table and graph results 6. Sample solutions of selected engineering problems in MATLAB environment 7. Sample solutions of selected engineering problems in MATLAB environment 8. 1.Midterm Exam 9. Integration with numerical methods and programming 10. Integration with numerical methods and programming 11. Solutions of differential equations 12. Solutions of differential equations 13. Numerical solution of truss systems - finite elements 14. Numerical solution of truss systems - finite elements 15. Numerical solution of truss systems - finite elements		
<b>Planned learning activities and teaching methods</b>	3 lecture hours per week (3+0) Searching from internet, library work Report preparing Reading Midterm exam and required works Final exam and required works		
<b>Assessment methods and criteria</b>		Quantity	Percentage (%)
	Mid-terms	1	30
	Assignment	5	10
	Exercises	-	-

	Projects	1	20						
	Practice	-	-						
	Quiz	-	-						
	Contribution of In-term Studies to Overall Grade %		60						
	Contribution of Final Examination to Overall Grade (%)		40						
	Attendance	-	-						
<b>Workload</b>	<b>Work activity</b>	<b>Total Week Count</b>	<b>Weekly Duration (in hour)</b>	<b>Total Workload in Semester</b>					
	Theoretical Study Hours of Course Per Week	13	3	39					
	Practicing Hours of Course Per Week	0	0	0					
	Reading	13	2	26					
	Searching in Internet and Library	0	0	0					
	Designing and Applying Materials	0	0	0					
	Preparing Reports	0	0	0					
	Preparing Presentation	0	0	0					
	Presentation	0	0	0					
	Mid-Term and Studying for Mid-Term	2	10	20					
	Final and Studying for Final	1	10	15					
	Other	5	2	10					
	Total Workload:			110					
	Total Workload / 25:			4.4					
ECTS:			4						
<b>Course's contribution to program</b>	No	Program Learning Outcomes			1	2	3	4	5
	1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.						X	
	2	Ability to identify, formulate, and solve complex civil engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.						X	
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.			X				
	4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in civil engineering practice; ability to employ information technologies and to use at least one computer programming language effectively.							X
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex civil engineering problems or discipline specific research questions.			X				
	6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.			X				
	7	Ability to work individually.						X	
	8	Ability to communicate effectively in Turkish, both orally and in writing; ability to			X				

		write effective reports and comprehend written reports.						
	9	Knowledge of English of B1 level according to <u>Common European Framework of Reference</u> .			X			
	10	Prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.	X					
	11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.				X		
	12	Consciousness to behave according to ethical principles and professional and ethical responsibility.			X			
	13	Knowledge on standards used in civil <u>engineering practice</u> .	X					
	14	Knowledge about business life practices such as project management, risk management, and change management.	X					
	15	Awareness in entrepreneurship, innovation; knowledge about sustainable development.	X					
	16	Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering.	X					
	17	Awareness of the legal consequences of engineering solutions.	X					
<b>Name of lecturer(s) and contact information</b>	Doç.Dr.Bahadır ALYAVUZ <a href="mailto:balyavuz@gazi.edu.tr">balyavuz@gazi.edu.tr</a>							