



MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2017-2018 Spring

CSE3064 – Formal Languages and Automata Theory

COURSE DESCRIPTION FORM

Offering Department	Department of Computer Engineering		Undergraduate must course (6th semester)					
Course Code	CSE3064							
Course Name	Formal Languages and Automata Theory							
Language of Instruction	English							
ECTS	6							
Contact Hours	Theoretical (T): 3	Practice (U): 0	Laboratory (L): 0					
Pre-requisites	CSE2023 – Discrete Computational Structures							
Instructor	Name	Assist. Prof. Ali Haydar Özer						
	E-mail	haydar.ozer@marmara.edu.tr						
Course Materials	Mandatory	Introduction to the Theory of Computation, 3 rd Edition, Michael Sipser, Cengage Learning.						
	Recommended	Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson.						
Course Objectives	The aim of the course is to provide students an overview of the theoretical foundations of computer science, and to teach them the basic concepts and models of formal languages and automata theory. The students are expected to gain the ability of abstract thinking and mathematical proving.							
Course Content	Deterministic finite state automata. Non-deterministic finite state automata. Regular expressions and regular languages. Properties of regular languages. Context-free grammars and properties of context-free languages. Push-down automata. Turing machines. Undecidability.							
Learning Outcomes	LO1	To be able to identify regular languages, to understand their properties, and to design deterministic finite state automata.						
	LO2	To be able to design nondeterministic finite state automata and define regular expressions.						
	LO3	To be able to identify context-independent languages and define grammar or push-down automata for these languages.						
	LO4	To be able to understand how Turing machines work, to design Turing machines, and to identify undecidable languages.						
	LO5	To be able to make formal proofs within the scope of automata theory.						
Program Outcomes		LO1	LO2	LO3	LO4	LO5		
PO1	Adequate knowledge in mathematics, science (a) and computer engineering subjects (b) pertaining to the relevant discipline (1); ability to use theoretical and applied information in these areas to model and solve engineering problems (2).		1b	1b	1b	1b	1b	
PO14	Knowledge of data structures and algorithm analysis (a), database management systems (b), operating systems (c), software engineering (d), computer architecture (e) and automata theory (f) in computer engineering.		f	f	f	f	f	
Subjects (Knowledge, Skills and behaviors), Contributions of Subjects to Learning Outcomes, Assessment Methods	No	Week	Subjects	LO1	LO2	LO3	LO4	LO5
	S1	1	Introduction to Automata Theory and Concept of Languages.	MF,H				
	S2	2-3	Deterministic Finite State Automata and Regular Languages.	MF,H				
	S3	4	Nondeterministic Finite State Automata.		MF,H			
	S4	5	Properties of Regular Languages.	MF,H				MF,H
	S5	6	Regular Expressions		MF,H			
	S6	7	Pumping Lemma for Regular Expressions.					MF,H
	S7	8	Context-Free Grammars.			MF,H		
	S8	9	Grammar Normal Forms.			MF,H		
	S9	10-11	Push-Down Automata, Context-Free Languages and Pumping Lemma for Context-Free Languages.			MF,H		MF,H
	S10	12-13	Turing Machines and Variations of Turing Machines.				MF,H	
S11	13-14	Decidability. Decidable and Undecidable Languages.				MF,H		
Assessment Methods and Weights	No	Type	Weight	Implementation Rule		Make-up Rule		
	MF	Midterm, Final	70%	One closed-book midterm exam and one closed-book final exam are given.		Marmara University regulations will be followed for make-up exams.		

	H	Homework	30%	A total of two assignments are given. Each assignment is expected to be completed in three weeks. Late submissions are not allowed and a grade of zero is given to unsubmitted assignments.	-									
	TOTAL		100%											
Determining Letter Grades	<ul style="list-style-type: none"> The letter grades will be determined based on the midterm and final exams, and assignments. 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. 													
	<table border="1"> <tr> <td>Assessment</td> <td>Midterm</td> <td>Homework</td> <td>Final</td> <td>TOTAL</td> </tr> <tr> <td>Weight</td> <td>30</td> <td>30</td> <td>40</td> <td>100</td> </tr> </table>					Assessment	Midterm	Homework	Final	TOTAL	Weight	30	30	40
Assessment	Midterm	Homework	Final	TOTAL										
Weight	30	30	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	Homework	The students solve the problems given as homework.		2x27=54									
10	Pre-class learning of Course Material	The students study and learn the new subjects from course materials.		0.5x42=21										
11	Review of Course Material	Students review the course subjects from course materials to prepare for the exams and homework.		0.5x42=21										
12	Office Hour	Students ask questions to the instructor or the assistant during office hours.		8										
Total				150										
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.													