



HASAN KALYONCU UNIVERSITY
Faculty of Engineering
Course Description Form

COURSE: Formal Languages and Automata					
CODE: CENG303		SEMESTER: FALL			
LANGUAGE: ENGLISH		TYPE: COMPULSORY			
PRE-REQUISITES: - CO-REQUISITES: -		THEORY	PRACTICAL	CREDIT	ECTS
WEEKLY HOURS:		3	0	3	4

CONTENT OF THE COURSE:

Formal proofs. Finite automata, regular expressions, and algorithms connecting the two notions. Pumping lemma for regular languages and properties of regular languages. Context-free grammars. Pumping lemma for context-free languages and properties of context-free languages. Push-down automata and Turing machines.

OBJECTIVE OF THE COURSE:

Aim of this course is to make an introduction to the formal language theory and establish a theoretical foundation for computer science. It is intended to give the students basic understanding of abstraction using formal languages and abstract machines while investigating the concept of computation.

WEEKLY SCHEDULE

Week	Topics
1	Formal Proofs
2	Finite Automata
3	Non-deterministic Automata
4	Regular Expressions
5	Closure Properties of Regular Languages
6	Pumping Lemma for Regular Languages
7	Midterm Exam
8	Context Free Languages and Grammars
9	Pushdown Automata
10	Pumping Lemma for Context Free Languages
11	Context-sensitive Languages
12	Turing Machines
13	Variants of Turing Machines
14	Semester Review

TEXTBOOK: Michael Sipser, Introduction to the Theory of Computation, 3rd edition.

REFERENCE BOOKS: J. Hopcroft, R. Motwani, and J. Ullman. Introduction to Automata Theory, Languages, and Computation, Pearson/Addison-Wesley.

EVALUATION SYSTEM:		
IN-TERM STUDIES	QUANTITY	PERCENTAGE (%)
Midterm Exam	1	30
Homework	0	0
Laboratory works	0	0
Quiz	5	30
Final Exam	1	40
TOTAL	7	100
CONTRIBUTION OF INTERM STUDIES TO OVERALL GRADE	6	60
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE	1	40
TOTAL	7	100

COURSE CATEGORY:	PERCENTAGE (%)
Mathematics and Basic Sciences	20
Engineering	40
Engineering Design	40
Social Sciences	

TABLE OF ECTS / WORKLOAD:			
Activities	QUANTITY	Duration (Hour)	Total Workload
Course Duration	13	3	39
Hours for off-the-classroom study (Pre-study, practice)	14	5	70
Laboratory works	0	0	0
Mid-term	1	2	2
Final examination	1	2	2
Homework	0	0	0
Quiz	5	0.5	2.5
Total Work Load			115.5
Total Work Load / 30			3.85
ECTS Credit of the Course			4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
LO1	1	3	0	0	0	0	0	0	0	0	0
LO2	1	3	0	0	0	0	0	0	0	0	0
LO3	1	3	0	0	0	0	0	0	0	0	0
LO4	1	3	0	0	0	0	0	0	0	0	0
LO5	1	3	0	0	0	0	0	0	0	0	0
LO6	2	3	0	0	0	0	0	0	0	0	0
Values: 0: None 1: Low 2: Medium 3: High PO: Program Outcome LO: Learning Outcome											

INSTRUCTOR(S):	Asst. Prof. Dr. Ulaş GÜLEÇ
FORM PREPARATION DATE:	23.05.2019

LEARNING OUTCOMES OF THE COURSE:	PROGRAM OUTCOMES:
<p>LO1: To understand the concept of formal languages.</p> <p>LO2: To understand the classification of languages.</p> <p>LO3: To gain basic understanding of finite automata, what they can and what they cannot do.</p> <p>LO4: To gain basic understanding of pushdown automata, what they can and what they cannot do.</p> <p>LO5: To gain basic understanding of the ultimate computing machines – Turing Machines</p> <p>LO6: To understand what is computable and what is not</p>	<p>PO1: 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.</p> <p>PO2: Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.</p> <p>PO3: 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.</p> <p>PO4: Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.</p> <p>PO5: Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.</p> <p>PO6: Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.</p> <p>PO7: Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports,</p>

	<p>make effective presentations, and give and receive clear and intelligible instructions.</p> <p>PO8: 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.</p> <p>PO9: Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.</p> <p>PO10: Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development.</p> <p>PO11: 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; awareness of the legal consequences of engineering solutions.</p>
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