<table>
<tr><th colspan="2">COURSE DESCRIPTION FORM</th></tr>
<tr><td>Course Code and Name</td><td>BM303 - FORMAL LANGUAGES AND AUTOMATA</td></tr>
<tr><td>Course Semester</td><td>5</td></tr>
<tr><td>Catalogue Data of the Course (Course Content)</td><td>Introduction, File Structures, Organization and Processing, Physical aspects of storage area, Sequential file development, decomposition/composition algorithms, Direct file processing techniques, Indexed file processing techniques, Multi-list File Organization, Introduction to Database Management Systems</td></tr>
<tr><td>Course Textbooks</td><td>Introduction to the Theory of Computation (3rd Edition), Michael Sipser</td></tr>
<tr><td>Supplementary Textbooks</td><td>Puntambekar, A. A. (2008). Formal Languages and Automata Theory. Technical Publications.

Linz, P. (2011). An introduction to formal languages and automata. Jones & Bartlett Publishers.</td></tr>
<tr><td>Credit (ECTS)</td><td>6</td></tr>
<tr><td>Prerequisites for the Course (Attendance Requirements)</td><td>Prerequisites course: No
Co-requisites: Obligatory course attendance 70%</td></tr>
<tr><td>Course Type</td><td>Compulsory</td></tr>
<tr><td>Language of Instruction</td><td>Turkish</td></tr>
<tr><td>Course Objectives</td><td>Classification of automata and formal languages, teaching regular expressions, teaching natural and formal languages, teaching independent languages from content, teaching Pushdown Automata and teaching Turing machines</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Defines machine models formally.
2. It synthesizes certain automatons with many features.
3. It implements transformation between multiple representations of certain automatons.</td></tr>
<tr><td>Instruction Method
(Face-to-face, Distance education etc.)</td><td>The mode of delivery of this course is face to face.</td></tr>
<tr><td>Weekly Schedule of the Course</td><td>1. Week Sets and Relations
2. Week Formal Languages
3. Week Deterministic Finite Automata - DFA
4. Week Deterministic Finite Automata - DFA
5. Week Nondeterministic Finite Automata - NFA
6. Week Equivalence of DFA and NFA
7. Week Equivalence of DFA and NFA
8. Week Pumping Lemma
9. Week State Minimization
10. Week Context Free Grammars - CFG
11. Week Pushdown Automata - PDA
12. Week Turing Machines
13. Week Random Access Turing Machines - RATM
14. Week Church - Turing Thesis</td></tr>
<tr><td>Teaching Activities
(The time spent for the activities listed here will determine the amount of credit required)</td><td>Weekly theoretical course hours: 3
Reading Activities
Internet browsing, library work
Designing and implementing materials
Preparation of Midterm and Midterm Exam
Final Exam and Preparation for Final Exam</td></tr>
<tr><td>Assessment Criteria</td><td>
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<tr><th></th><th>Number(s)</th><th>Weight (%)</th></tr>
<tr><td>Midterm exam</td><td>1</td><td>30</td></tr>
<tr><td>Assignment</td><td>2</td><td>20</td></tr>
<tr><td>Application</td><td></td><td></td></tr>
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Project		
Practice		
Quiz	4	10
Final exam	1	40
Total	8	100

Workload of the Course

Activity	Number of Weeks	Duration (Weekly Hour)	End of Semester Total Workload
Weekly theoretical course hours	14	3	42
Weekly practical course hours	0	0	0
Reading activities	14	1	14
Internet search and library work	1	10	10
Designing and implementing materials	3	15	45
Making a report	0	0	0
Preparing and making presentations	0	0	0
Midterm and revision for midterm	1	19	19
Final exam and revision for final exam	1	20	20
Total workload			150
Total workload/ 25			6
Course Credit (ECTS)			6

Contribution Level between Course Outcomes and Program Outcomes

No	Program Çıktıları	1	2	3	4	5
1	Knowledge of mathematics, science, basic engineering, computing, and computer engineering; ability to use this knowledge in solving complex engineering problems.					x
2	Ability to define, formulate and analyze complex engineering problems using basic science, mathematics and engineering knowledge and considering the UN Sustainable Development Goals relevant to the problems addressed.			x		
3	Ability to design creative solutions to complex engineering problems; ability to design complex systems, processes, devices, software, algorithms or products to meet current and future requirements, considering realistic constraints and conditions.					x
4	Ability to select, use and develop appropriate techniques, resources and modern engineering and informatics tools, including estimation and modeling, for the analysis and solution of complex engineering problems while being aware of their limitations.				x	
5	Ability to use research methods to examine complex engineering problems or research topics in computer engineering, including reviewing the literature, designing experiments, conducting experiments, collecting data, analyzing and interpreting results.			x		
6	Knowledge of the effects of engineering practices and the standards used in these					

			practices on society, health and safety, economy, sustainability and environment within the scope of the UN Sustainable Development Goals; awareness of the consequences of engineering solutions in the fields of information security and law.						
		7	Acting in accordance with engineering professional principles and knowledge on ethical responsibility; awareness of acting impartially, without discrimination on any issue, and being inclusive of diversity.						
		8	Ability to work effectively individually and as a team member or leader in intradisciplinary and multidisciplinary teams (face-to-face, remote, or hybrid).						
		9	Ability to conduct effective verbal and written communication on technical issues in Turkish or English, prepare reports, make effective presentations and prepare software documentation, considering the various differences of the target audience (such as education, language, profession).					x	
		10	Knowledge of business practices such as project, risk and change management and economic feasibility analysis; awareness of entrepreneurship and innovation.						
		11	Lifelong learning skill that includes the ability to learn independently and continuously, to adapt to new and developing scientific practices and technologies, and to think inquisitively about technological changes.					x	
Lecturer(s) and Contact Information	Prof. Dr. Hacer KARACAN hkaracan@gazi.edu.tr								