COURSE DESCRIPTION FORM	
Course Code and Name	CENG311 COMPUTER ARCHITECTURE
Course Semester	5
Catalogue Data of the Course (*Course Content*)	Basic components of the computer, computer development and performance, bus structures, cache, instruction sets, addressing modes and formats, register organization and pipelining, RISC and CISC architectures, instruction level parallelism and superscalar processors, control unit, multicore processors, multiprocessor systems, GPGPU.
Course Textbooks	1. Stallings, W., "Computer Organization and Architecture 11/e", Pearson, 2021.
Supplementary Textbooks	1. Hennessy, J.L., Patterson, D.A., "Computer Architecture a Quantitative Approach 6/e", Morgan Kaufmann, 2019. 2. Mano, M.M., "Computer System Architecture 3/e (Update)", Pearson, 2017. 3. Mano, M.M., Kime, C.R., "Logic and Computer Design Fundamentals, 4/e", Pearson, 2014.
Credit (*ECTS*)	6
Prerequisites for the Course (*Attendance Requirements*)	Attendance is mandatory
Course Type	Compulsory
Language of Instruction	Turkish
Course Objectives	To teach the basic components of the computer, performance criteria, bus structures and operation, cache design criteria, instruction sets and design criteria, addressing modes and comparative analysis, register organization and pipelining structure, structure and comparative analysis of RISC and CISC architectures, instruction level parallelism and operation of superscalar processors, the design and operation of the control unit, comparative analysis of multicore processors and multiprocessor system architectures, and GPGPU architectures.
Course Learning Outcomes	1. Defines the basic components of the computer. 2. Explains the performance criteria of the computer. 3. Explains bus structures. 4. Explains cache design criteria. 5. Explains instruction set design criteria. 6. Explains addressing modes and formats. 7. Explains the pipelining design. 8. Defines the differences between RISC and CISC architectures. 9. Explains instruction level parallelism and superscalar processors. 10. Explains the control unit design. 11. Explains multicore and multiprocessor systems. 12. Explains GPGPU architecture.
Instruction Method *(Face-to-face, Distance education etc.)*	Face-to-face
Weekly Schedule of the Course	Week 1: Introduction Week 2: Computer evolution and performance Week 3: BUS structures Week 4: Cache memory Week 5: Instruction sets Week 6: Addressing modes and formats Week 7: Register organization Week 8: Pipelining Week 9: RISC and CISC architectures Week 10: Instruction-level parallelism and superscalar processors Week 11: Control unit Week 12: Multicore processors Week 13: Multi processors systems Week 14: GPGPU

Teaching Activities
(The time spent for the activities listed here will determine the amount of credit required)

Weekly theoretical course hours: 3
Reading activities
Internet search and library work
Making a report
Midterm and revision for midterm
Final exam and revision for final exam

Assessment Criteria

	Number(s)	Weight (%)
Midterm exam	1	35
Assignment	4	25
Application	-	-
Project	-	-
Practice	-	-
Quiz	-	-
Final exam	1	40
Total		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	-	-	-
Reading activities	14	2	28
Internet search and library work	14	2	28
Designing and implementing materials	-	-	-
Making a report	4	4	16
Preparing and making presentations	-	-	-
Midterm and revision for midterm	1	12	12
Final exam and revision for final exam	1	24	24
Total workload			36
Total workload/ 25			6
Course Credit (ECTS)			6

Contribution Level between Course Outcomes and Program Outcomes

No	Program Outcomes	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					X

		solution of complex engineering problems while being aware of their limitations.					
	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.			X		
	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.					
Lecturer(s) and Contact Information	Lecturer's First/Last Name: Prof. Dr. M. Ali AKCAYOL E-mail address: akcayol@gazi.edu.tr						