COURSE DESCRIPTION FORM	
Course Code and Name	CENG441 INTERNET OF THINGS (TECH. ELECT.)
Course Semester	7
Catalogue Data of the Course (*Course Content*)	Internet of Things (IoT) basic concepts, IoT Architecture and Components, IoT Communication/Messaging Protocols, Future Trends in IoT, Next Generation IoT (NGIoT) Concept and Applications, NGIoT and Big Data, NGIoT and Artificial Intelligence, Deep Learning in NGIOT Applications
Course Textbooks	F. Mattern and C. Floerkemeir, "From the Internet of Computers to the Internet of Things", From Active Data Management to Event-Based Systems and More, Lecture Notes in Computer Science, Vol. 6462, pp. 242-259, 2010. John Davies, Carolina Fortuna, " The Internet of Things - From Data to Insight" Wiley 2020 Ovidiu Vermesan and Joel Bacquet, ""Next Generation Internet of Things- Distributed Intelligence at the Edge and Human Machine-to-Machine Cooperation, River Publishers, 2018 Atzori, Luigi, Antonio Iera, and Giacomo Morabito. "The internet of things: A survey." Computer networks 54.15 (2010): 2787-2805.
Supplementary Textbooks	Al-Fuqaha, Ala, et al. "Internet of things: A survey on enabling technologies, protocols, and applications." IEEE communications surveys & tutorials 17.4 (2015): 2347-2376.
Credit (*ECTS*)	6
Prerequisites for the Course (*Attendance Requirements*)	-
Course Type	Elective
Language of Instruction	English
Course Objectives	This course aims to provide theoretical knowledge and practical skills about next generation IoT systems. Accordingly, goals are to provide information about the Internet of Things (IoT) architecture, protocol and usage areas, and also to develop IoT-based applications.
Course Learning Outcomes	1. Has knowledge about the Internet of Things (IoT) 2. Learns IoT application areas 3. Designs an IoT project and choosing the appropriate hardware and software for IoT projects 4. Knows the next generation IoT (NGIoT) components 5. Ensures information security in IoT
Instruction Method (*Face-to-face, Distance education etc.*)	Face-to-face
Weekly Schedule of the Course	Week 1. Internet of Things (IoT) Overview and Basic Concepts Week 2. IoT Architecture and Components Week 3. IoT Communication Protocols (MQTT, COAP) Week 4. IoT Communication Protocols (AMQP, DDS, ZeroMQ) Week 5. IoT Application Areas Week 6. IoT Application Areas Week 7. Overview of Next Generation IoT Applications (NGIoT) Week 8. NGIoT-Edge/Fog Computing Week 9. NGIoT-Edge/Fog Computing Week 10. NGIoT-Artificial Intelligence and Application Areas Week 11. NGIoT-Artificial Intelligence and Application Areas Week 12. NGIoT-Tactile IoT, Digital twin and Application Areas Week 13. Security in the Internet of Things Week 14. Security in the Internet of Things
Teaching Activities (*The time spent for the activities listed here will determine the amount of*	Weekly theoretical course hours:3 Reading activities Internet search and library work Making a report

		Number(s)	Weight (%)			
credit required)	Preparing and making presentations Midterm and revision for midterm Final exam and revision for final exam					
Assessment Criteria	Midterm exam	1	30			
	Assignment					
	Application					
	Project	1	30			
	Practice					
	Quiz					
	Final exam	1	40			
	Total	3	100			

	Activity	Number of Weeks	Duration (Weekly Hour)	End of Semester Total Workload
Workload of the Course	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	1	10	10
	Preparing and making presentations	1	10	10
	Midterm and revision for midterm	1	20	20
	Final exam and revision for final exam	1	20	20
	Total workload			150
	Total workload/ 25			6
	Course Credit (ECTS)			6

	No	Program Outcomes	1	2	3	4	5
Contribution Level between Course Outcomes and Program Outcomes	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			X		

No	Description	1	2	3	4	5
	results.					
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.		X			
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).			X		
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.		X			
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	Lecturer's First/Last Name: Asst. Prof. Dr. Feyza YILDIRIM OKAY E-mail address: feyzaokay@gazi.edu.tr