

Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering				Institute of Mechatronics and Vehicle Engineering					
Subject title and code:							Credits:	4	
Full-time study		2026/27		ac. 1		semester			
				year					
The course is available at:				mechatronical engineering					
Supervised by:				Dr. Nagy István					
				Instructors:				Magashegyi Balázs	
Prerequisite (neptun code):									
Weekly number of lessons									
Lecture: 2		Group seminar:			Lab: 2		Consultation:		
Way of assessment:		Midterm mark		(Written)					
Online consultation (in case it's required): ... (BBB link)									
Edu. goal:		The aim of the course is to provide students with knowledge of industrial and OT communication networks, their architecture, segmentation and redundancy concepts, as well as Ethernet-based networking fundamentals. The course covers the most important industrial, IoT, building automation and energy communication protocols, including Profinet, Profibus, S7 Communication, OPC UA, Modbus, MQTT, BACnet and IEC 61850. By the end of the semester, students apply their knowledge through the design of a complex industrial communication network.							
Schedule									
Education week		Topics							
1.		Ethernet Network Fundamentals							
2.		OT Networks I (Segmentation, VLANs, DHCP, NAT, FW, NGFW)							
3.		OT Networks II (Redundancy, ProfiNET, ProfiBUS)							
4.		General Protocols I (Profinet IO, S7 Communication, CAN Bus, EtherCAT, EtherNet/IP)							
5.		General Protocols II (OPC UA, Modbus)							
6.		Midterm Test 1							
7.		IoT Protocols (REST API, MQTT, Zigbee, Z-Wave)							
8.		BMS Protocols (BACnet, DALI, KNX, M-Bus)							
9.		Energy Communication Protocols (IEC 61850, IEC 60870-5-104, COSEM)							
10.		Complex Communication Network Design I							
11.		Complex Communication Network Design II							
12.		Complex Communication Network Design III							
13.		Complex Communication Network Design IV							
14.		Midterm Test 2							
Mid-semester requirements									
Test			Assignment to be submitted			Szöveg beírásához kattintson vagy koppintson ide.			
amount		dates	amount		deadlines	amount		dates	
2		2	1		2026.12.11				
According to the HKR attendance of group seminars and lab exercises are mandatory.									
Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:									
Test			Assignment to be submitted			Szöveg beírásához kattintson vagy koppintson ide.			

maximum points available ...points	minimum score required to pass /test ...points	maximum points available ...points	minimum score required to pass / assignment ...points	maximum points available ...points	minimum score required to pass /lab ...points
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Total number of points achievable in semester: 100points				
Grading thresholds	satisfactory 51 points and above	average 65 points and above	good 81 points and above	excellent 91 points and above
Other evaluation criteria:				
Receive a signature denied entry:				
Required references:				
Recommended references:				
Quality assurance methods of the subject:				

Things, that are not included, can be found within the regulations of Óbuda University.