

COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Mechanical Engineering									
Field of study	Mechatronics							Degree level and programme type	Bachelor's degree
Specialization/ diploma path	Intelligent Constructions							Study profile	
Course name	Intelligent systems communication							Course code	IS-FME-00251S
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	summer
	15			30				No. of ECTS credits	4
Entry requirements	C language programming, microcontrollers programming,								
Course objectives	To familiarize students with the methods of data exchange in intelligent systems, learning the definition of the term Internet of Things and structure of microprocessor systems. To familiarize students with network structures and topologies used in communication systems. Getting to know the architecture and topology of systems based on ethernet and WIFI networks. To familiarize with the Bluetooth communication standard. Learning the architecture of serial communication interfaces used in microprocessor systems, ie CAN, RS485, RS232, SPI, I2C. Acquainting with parameters and methods of implementation of particular serial interfaces.								
Course content	Defining the term of an intelligent system. The term of internet of things as an example of an intelligent system. History of the ethernet standard. Ethernet frame structure and transmission process. Architecture of TCP / IP protocol, OSI and TCP / IP models. Layers of TCP / IP and OSI models. Standards in wireless networks, WIFI network. Examples of the use of WIFI networks in microprocessor systems. Bluetooth communication standard, parameters, versions and application in microprocessor systems. The architecture of serial interfaces: CAN, SPI, I2C, RS232, RS485 and their comparison. Parameters of individual serial interfaces, examples of implementation on a selected microcontroller.								
Teaching methods	Lecture, project								
Assessment method	Lecture: written test, project – assessment of projects reports								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	Describes the ethernet architecture, data frame and its headers.							MK1_W06, MK1_W03	
LO2	Describes wireless communication standards: WIFI and Bluetooth							MK1_W06, MK1_W03	

LO3	Lists and explains layers of the OSI and TCP / IP model.	MK1_W06, MK1_W03	
LO4	Lists and describes a selected serial communication interface	MK1_W06, MK1_W03	
LO5	Develops a project of communication system using a selected microcontroller and communication standard	MK1_U07, MK1_U06	
LO6	Run and tests the developed communication system, prepares documentation of the prepared project.	MK1_U07, MK1_U06	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	Written test	L	
LO2	Written test	L	
LO3	Written test	L	
LO4	Written test	L	
LO5	Assessment of project report	P	
LO6	Assessment of project report	P	
Student workload (in hours)		No. of hours	
Calculation	participation in lectures	15	
	participation in projects	30	
	preparation for a written test	18	
	preparation for project tasks	23	
	preparation of project report and presentations	19	
	participation in consultations	3	
	TOTAL:	108	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		48	1,5
Student workload – practical activities		74	2,5
Basic references	<ol style="list-style-type: none"> 1. Douglas E. Comer, Computer Networks and Internets, Prentice Hall 2009, 2. Charles E. Spurgeon, Joann Zimmerman, Ethernet: The Definitive Guide. 2nd Edition, O'Reilly Media, 2014, 3. Daniel Briere, Pat Hurley, Edward Ferris, Wireless Home Networking for Dummies, Wiley Publishing, 2011, 4. Louis E. Frenzel, Jr, Handbook of Serial Communications Interfaces, Elsevier, 2016, 5. Brent A. Miller, Chatschik Bisdikian, Bluetooth Revealed, Prentice Hall, 2000, 		
Supplementary references	<ol style="list-style-type: none"> 1. Peczarski Marcin, Mikrokontrolery STM32 w sieci Ethernet w przykładach, Wyd. BTC, 2011, 2. Paprocki Krzysztof, Mikrokontrolery STM32 w praktyce, Wyd. BTC, 2009, 3. Alexander G dean, Embedded Systems Fundamentals with Arm Cortex M Based Microcontrollers, Arm Education Media, 2017, 4. Pakdel, Majid, Advanced Programming with STM32 Microcontroller, Elektor Verlag, 2020. 		

Organisational unit conducting the course	Department of Robotics and Mechatronics	Date of issuing the programme
Author of the programme	PhD. DSc Cezary Kownacki	16-03-2021

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar