GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Introduction to Internet of Things, PG_00054484		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Control Systems Engineering -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Robert Smyk	
	Teachers	dr inż. Robert Smyk	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

E-learning hours included: 0.0

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11783

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	8.0	12.0	50

Subject objectives

Introduction to Internet of Things (IoT) systems, getting to know typical architectures, concepts of designing hardware and software for IoT. Introduction to the design aspects of IoT edge devices. Acquisition of basic programming skills in a selected environment dedicated to IoT.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W06	He knows the basic architectures of IoT systems	[SW1] Assessment of factual knowledge
K7_U03	Can prepare an raport	[SU1] Assessment of task fulfilment
K7_U04	Analyzes the technical data contained in the documentation of the electronic module	[SU2] Assessment of ability to analyse information
K7_U07	He knows the basics of working in the IDE programming environment	[SU4] Assessment of ability to use methods and tools
K7_W11	He can program the elementary method of data transfer using the selected protocol	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Basic concepts of IoT (internet of things), application examples. What features does a smart device have? Principles of building IoT systems. Layered structure of the IoT system.Examples of selected IoT architectures. Basics of communication in the structure of IoT. Principles of communication programming in the layers of the IoT system (inter-system communication protocols (I2C, SPI, USART etc.), between modular (Bluetooth, ZigBee) and inter-layer (Ethernet, Wifi)). Inter-process programming. Elements of OS / RTOS in IoT. Basics of the IoT cloud, data analysis, visualization. IoT security basics. Managing energy consumption in IoT edge devices.

Prerequisites and co-requisites

Basics of microprocessor technology, operating systems, basics of programming, computer networks

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	final project	60.0%	50.0%
	excercises	60.0%	50.0%
Recommended reading	Basic literature	1. Giacomo Veneri , Antonio Capasso , Hands-On Industrial Internet of Things: Create a powerful Industrial IoT infrastructure using Industry 4.0, Packt Publishing; 1st edition (November 29, 2018) 2. Dr Kamlesh Lakhwani , Dr Hemant Kumar Gianey , Joseph Kofi Wireko, Internet of Things (IoT): Principles, Paradigms and Applications of IoT, BPB Publications; 1st edition (February 27, 2020) 3. Samuel Greengard, The Internet of Things (The MIT Press Essential Knowledge series), The MIT Press (March 20, 2015) 4. John Rossman, The Amazon Way on IoT: 10 Principles for Every Leader from the World's Leading Internet of Things Strategies, December 20, 2016	
	Supplementary literature	1. Bruce Sinclair , IoT Inc: How Your Company Can Use the Internet of Things to Win in the Outcome Economy Hardcover May 29, 2017 2. Dokumentacja bibliotek Mbed OS, https://os.mbed.com/	
	eResources addresses	Adresy na platformie eNauczanie: WPROWADZENIE DO INTERNETU RZECZY [2023/24] - Moodle ID: 36049 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36049	
Example issues/ example questions/ tasks being completed	List the basic features of an intelligent device in the IoT structure. List and discuss the layers of the IoT system. List the protocols and discuss the methods of communication in the various layers of the IoT. Provide an interprocess management method in an edge device IoT application.		
Work placement	Not applicable		