

COURSE DESCRIPTION CARD

Białystok University of Technology									
Field of study	Electrical and Electronic Engineering							Degree level and programme type	Bachelor's degree
Specialization/ diploma path	-							Study profile	General-academic
Course name	Digital Systems							Course code	IS-FEE-10040W
								Course type	Elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter
	15		30		15			No. of ECTS credits	5
Entry requirements	-								
Course objectives	Teaching a variety of problems related to contemporary digital systems based on micro-controllers and FPGA devices. Student will explain principles of operation of a variety of digital subsystems related to industrial digital systems and design simple digital subsystems.								
Course content	<p><u>Lecture</u>: Topics address electrical principles, semiconductor and integrated circuits, digital fundamentals, microcomputer systems based on microcontrollers and FPGA devices, serial interfaces for local communication.</p> <p><u>Laboratory classes</u>: Practical exercises in programming and designing digital systems based on microcontrollers and FPGA and softcore processors.</p>								
Teaching methods	Lecture, laboratory classes, individual consultations, mini projects								
Assessment method	Lecture – set of reports Laboratory classes– set of exercises and reports, SW – project evaluation								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
L01	Student recognizes and understands wiring diagrams related to digital systems								
L02	Student identifies various data buses and interfaces from the wiring diagrams								
L03	Student determines function and operation of the various modules and sensors and has a good knowledge of how they are used in the management of the digital system								
L04	Student distinguishes between various functions that are part of an industrial digital system								
L05	Student uses suitable programming tools								

L06	Student uses application notes and data sheets	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
L01	written report on lecture content	L
L02	written report on lecture content	L
L03	written report on lecture content	L
L04	written report on lecture content	L
L05	evaluating the student's laboratory reports	LC, SW
L06	evaluating the student's laboratory reports	LC, SW
Student workload (in hours)		No. of hours
Calculation	lecture attendance	15
	participation in classes, laboratory classes, etc.	30
	preparation for a written test related to the lecture	25
	preparation for a written test related to the classes, laboratory classes etc.	15
	reports preparation related to the lecture, laboratory classes, project etc.	30
	participation in student-teacher sessions related to the lecture, classes, laboratory classes, project etc.	10
	TOTAL:	125
Quantitative indicators		HOURS
Student workload – activities that require direct teacher participation		55
Student workload – practical activities		85
Basic references	1. Ronald J. Tocci: Digital Systems: Principles and Applications, 2014. 2. William J. Dally: Digital Design: A Systems Approach, 2012. 3. Elliot Williams: AVR Programming: Learning to Write Software for Hardware, 2014. 4. Donzellini, G., Oneto, L., Ponta, D., Anguita, D.: Introduction to Digital Systems Design, Springer, 2019. 5. Joseph Yiu: The Definitive Guide to ARM® Cortex®-M3 and Cortex®-M4 Processors, 2014.	
Supplementary references	1. Barrett S.: Embedded Systems Design with the Atmel AVR Microcontroller, Morgan & Claypool Publishers, 2009. 2. Barrett S.: Atmel AVR Microcontroller Primer: Programming and Interfacing, Morgan & Claypool Publishers, 2007. 3. AgusKurniawan: Getting Started With STM32 Nucleo Development, 2015.	
Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme
Author of the programme	Wojciech Wojtkowski, Ph.D.	2021-03-02

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