

## 表 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Digital Technology Basics, PG_00047825								
Field of study	Biomedical Engineering								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2024/2025			
Education level	first-cycle studies		Subject group			Optional subject group Subject group related to scientific research in the field of study			
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	3		Language of instruction			Polish			
Semester of study	5		ECTS credits			2.0			
Learning profile	general academic profile		Assessment form		assessment				
Conducting unit	Department of Automatic Control -> Faculty of Electronics, Telecommunications and Informatics								
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Raczyński						
	Teachers dr inż. Paweł Raczyński								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	15.0	0.0	15.0	0.0		0.0	30	
	E-learning hours included: 0.0								
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		2.0		18.0		50	
Subject objectives	1. Aims of the course (effects of the course): Skills of digital and microprocessor system description, analysis and designing . 2. Description of CCs: logic functions and truth tables, description of SCs: state transition tables and diagrams for Moore and Mealy models. Examples of CCs and SCs circuits.Positional number systems: decimal, binary, octal, hexadecimal. 3. SOP, POS and canonical forms of logic functions 4. Simplification of logic functions using Karnaugh tables and, Quine-McCluskey methode . 5. CC design with logic gates AND, OR, NOT,NAND and NOR.								

Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	In the classes of digital circuits/ logical/students will gain knowledge in the field of: -Mathematical apparatus used to describe combination and sequential systems -Introduction to binary system, binary arithmetic, Boolean Algebra -Logical functions -Basic concepts, combinational circuits, sequential layouts -Synthesis of combinational systems Synchronous sequential Layouts -Asynchronous sequential system synthesis -Memory Systems	[SW1] Assessment of factual knowledge				
	[K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications	In the classes of digital circuits/ logical/students will gain knowledge in the field of: -Mathematical apparatus used to describe combination and sequential systems -Introduction to binary system, binary arithmetic, Boolean Algebra -Logical functions -Basic concepts, combinational circuits, sequential layouts -Synthesis of combinational systems Synchronous sequential Layouts -Asynchronous sequential system synthesis -Memory Systems	[SU4] Assessment of ability to use methods and tools				
Subject contents	1. Aims of the course (effects of the course): Skills of digital and microprocessor system description, analysis and designing with use of IC catalogues and application notes. 2. Description of CCs: logic functions and truth tables, description of SCs: state transition tables and diagrams for Moore and Mealy models. Examples of CCs and SCs circuits.Positional number systems: decimal, binary, octal, hexadecimal. 3. Signed number representation BIN, HEX, BCD, U1, U2, and binary arithmetic, floating-point notation. 4. SOP, POS and canonical forms of logic functions forms, other Algebras examples, exemplary uses of Boo-lean Algebra connecting networks 5. Simplification of logic functions using Karnaugh tables and, Quine-McCluskey methode . 6. CC design with logic gates AND, OR, NOT, NAND and NOR. Some						
Prerequisites and co-requisites	No requirements						
Assessment methods	Subject passing critoria	Passing throshold	Percentage of the final grade				
and criteria	activity / presence	50.0%	20.0%				
	Midterm colloquium	50.0%	80.0%				
Recommended reading	Basic literature M. Barski, W. Jędruch , Układy Cyfrowe W. Majewski, Układy log   Zieliński C.: Podstawy projektowania układów cyfrowych, Wydaw   Naukowe PWN, Warszawa 2003   Stefan Sieklicki script for the subject "Digital Technolog   Basics Gdansk 2013						
	Supplementary literature F. Tinder, Engineering Digital Design J. D. Daniels, Digital Desi Zero to One Texas Instruments, Digital Design Seminar						
	eResources addresses	Adresy na platformie eNauczanie:					

Example issues/ example questions/ tasks being completed	- Carry out the operation (10101)2 x (101) 2) the result reported in the decimal system,
	- The function f(d,c,b,a)= Π (0, 3, 5, 8, 12, 14, (2,11,13)) achieved using a a multiplexer 4/1 and NAND Gates.
	-Provide a table of trigger JK and D ,
	- Design the table in a logical network to build the NAND Gate
	- Design the synchronous presence or within binary digits given in the series in the number of ones is an even number other than zero, which should be indicated by setting the output in=1 for exactly one clock cycle.
Work placement	Not applicable