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 2023	Academic year of realisation of subject	2025/2026
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	Project	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_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
[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

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 remarks on simplification of SOP and POS forms contrary global simplification, transition times.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Midterm colloquium	50.0%	80.0%
activity / presence	50.0%	20.0%

Recommended reading

Basic literature	M. Barski, W. Jędruch , Układy Cyfrowe W. Majewski, Układy logiczne Zieliński C.: Podstawy projektowania układów cyfrowych, Wydawnictwo Naukowe PWN, Warszawa 2003 Stefan Sieklicki script for the subject "Digital Technology Basics Gdansk 2013
Supplementary literature	F. Tinder, Engineering Digital Design J. D. Daniels, Digital Design from 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