



## Subject card

Subject name and code	Informatics I, PG_00038090						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Daniel Wojciechowski				
	Teachers		dr hab. inż. Daniel Wojciechowski				
			dr inż. Wojciech Rosiński				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		10.0		45.0	100
Subject objectives	Transfer of fundamental concepts of number systems used in computer science. Acquainting a student with the basic components of the computer system and development and analysis of basic algorithms. Learning the basics of programming in C and C++.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U01		The student is able to retrieve information from the literature, can perform basic arithmetic operation in the natural binary system and two's complement system, design simple logic circuits and write simple programs using C language.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	K6_W07		The student disposes over the knowledge on foundations of computer arithmetic, logic circuits, design of simple algorithms, fundamental elements of computers systems and C language.		[SW3] Assessment of knowledge contained in written work and projects		
	K6_K01		The student is is able to find and utilize sources of information on programming languages, has the ability to work in a group.		[SK2] Assessment of progress of work [SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness		

Subject contents	<p>Overview of informatics, its main areas and basic concepts. Languages ANSI C and C + + . Examples of simple programs. Definition of variables. The assignment operator. Integer types and arithmetic operators. I / O operations for integer types. Relational and logical operators. Relational and logical expressions. Real type and operators of real arithmetic. I / O operations for real types. Grouping instruction. If statement. Else if statement. Nested if statement. While loop . For and while loops. Switch statement. Break statement. Continue statement. Goto statement. Identifiers. Keywords. The conditional operator. Comma operator. Increment and decrement operators. Standard arithmetic functions. Cast operator. Arithmetic conversions. Print formatting. One-dimensional and two-dimensional arrays. Basic operations on arrays. Representation of characters. Character types. I / O operations for character types. Character arrays. Fixed. Priorities operators. Boolean algebra. Logical functions. Basic logic functors. Elements of assembly language . Representation of information in computer systems. Number systems. Binary, hexadecimal and octal systems.. Conversions between number systems. Arithmetic in natural binary system. Representations sign-magnitude, one's complement and two's complement. Arithmetic operations in two's complement. Representation of real numbers. Von Neumann architecture. Architecture and operation of a simple microprocessor. Algorithms. Methods of algorithms notation. Flowcharts. The principles of creating flow charts. Selected algorithms. Elements of algorithm analysis. Elements of computer technology. MOS transistor. Simple CMOS. Basic combinational circuits. Full adder and half-adder. Ripple-carry adder. Multiplexer. Decoder. Flip-flop. Register. Counter. ROM and RAM. Selected features of modern processors.</p>		
Prerequisites and co-requisites	Basic knowledge of mathematics and physics at the high school level.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	classroom exercises	60.0%	33.0%
	laboratory	60.0%	33.0%
	lecture	60.0%	34.0%
Recommended reading	<p>Basic literature</p>		
		<p>1. W. Stallings, Computer system organization and architecture, WNT, W-wa, 2000.</p> <p>2. M.Czyżak, Elements of computer arithmetic, KETI PG, 2011.</p> <p>3. M.Czyżak, Lectures in basics of ANSI C, KETI PG, 2010.</p> <p>4. R.Smyk, M.Czyżak, A.Opaliński, Selected mechanisms of programming in C i C++, KETI PG, 2011.</p>	

	Supplementary literature	<p>1. S. Chalk, Computer architecture and organization, WNT, W-wa, 1998.</p> <p>2. N. Wirth, Algorithms and data structures=programs, WNT, W-wa, 1979. ( continuously reprinted in Biblioteka Klasyki Informatyki)</p> <p>3. A. R. Neibauer, C/C++, Your first program, Help, 1995 (now ed. IV)</p> <p>4. C. Sexton, C - it's simple, RM, W-wa, 2001.</p> <p>5. G. Perry, C in examples, Que, W-wa, 2000.</p> <p>6. Brian W. Kernighan, Dennis M. Ritchie, ANSI C, Programming, Helion, Gliwice, 2010 ( wyd.II).</p>
	eResources addresses	<p>Adresy na platformie eNauczanie: INFORMATYKA I [ET][2023/24] - Moodle ID: 36073 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36073">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36073</a></p>

<p>Example issues/ example questions/ tasks being completed</p>	<p>Computer arithmetic</p> <p>Computer arithmetic</p> <ul style="list-style-type: none"> <li>- convert a decimal to binary</li> <li>- convert a decimal fraction to a binary fraction</li> <li>- convert binary number to hexadecimal / octal</li> <li>- perform addition, subtraction, multiplication and division of two binary numbers</li> <li>- calculate the value of the binary number in the register after shifting a given number of positions</li> <li>- find the sign-magnitude, one's complement and two's complement representations</li> </ul> <p>of a decimal number</p> <ul style="list-style-type: none"> <li>- perform addition and subtraction of two numbers in two's complement, verify overflow.</li> </ul> <p>Logic functions and logic gates</p> <ul style="list-style-type: none"> <li>- for a logic function given in the table form find the SOP and POS forms</li> <li>- for a logic function given in the SOP form draw a NAND logic network</li> <li>- Simplify the logic expression using Boolean algebra laws</li> </ul> <p>Programming</p> <ul style="list-style-type: none"> <li>- Write a program in C that calculates the value of an arithmetic expression</li> <li>- Write a program in C that reverses the item order in an one-dimensional array</li> <li>- Write a program that finds the frequency of appearance of each item in an array</li> </ul>
<p>Work placement</p>	<p>Not applicable</p>