



## Subject card

Subject name and code	Digital Signal Processing, PG_00048436						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Tomasz Stefański				
	Teachers		dr hab. inż. Tomasz Stefański				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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		4.0		16.0	50
Subject objectives	Student designs basic digital signal processing algorithms in MATLAB - FIR and IIR digital filters, and FFT. Student describes fixed-point and floating-point digital signal processor architectures and data paths. Student explains arithmetics of processors and provides examples of applications.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_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		The student knows the architecture of signal processors and knows the structure of FPGAs.		[SW1] Assessment of factual knowledge		
	[K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum.		Student is able to design basic systems (filters and spectrum estimators) of digital signal processing.		[SW1] Assessment of factual knowledge		
	[K7_U07] can apply advanced methods of process and function support, specific to the field of study		Student is able to process signals in a digital way.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
Subject contents	1. MATLAB tools for designing DSP systems. FIR filters approximation and design methods. 2. IIR filters approximation and design methods. 3. Spectrum estimation using the FFT. Inverse FFT (IFFT). 4. Introduction to programming digital signal processors - DSP. Signal processor versus digital computer and programmable FPGA system. Basic features and differences. 5. DSP architectures and their specific features. 6. DSP processors classification and arithmetics. 7. Fixed-point and floating-point DSP data paths. Organization and access to memory. 8. Application examples.						

Prerequisites and co-requisites	Passed exam and test on Signal Processing.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam	51.0%	60.0%
	Colloquium	51.0%	40.0%
Recommended reading	Basic literature	S. W. Smith: Cyfrowe przetwarzanie sygnałów. Praktyczny podręcznik dla inżynierów i naukowców. Wydawnictwo BTC 2007. T.P. Zieliński: Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań. WKŁ Warszawa 2005.	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		