GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Digital Signal Processing, PG_00047483		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	English
Semester of study	1	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Decision Systems and Robotics -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Stefański	
	Teachers	dr hab. inż. Tomasz Stefański	

Lesson types

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 explaines arithmetics of processors and provides examples of applications.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] knows and understands, to an increased extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or other elements or programmable devices specific to the field of study, and organization of work of systems using computers or such devices	The student knows the architecture of signal processors and the structure of FPGA systems.	[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.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[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

<table>
<tr><td>Subject contents</td><td>Course content – lecture
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 programmamble 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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Passed exam and test on Signal Processing.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>51.0%</td><td>60.0%</td></tr>
<tr><td>Colloquium</td><td>51.0%</td><td>40.0%</td></tr>
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<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>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.</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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