GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Applications of Signal Processors, PG_00055273		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Szwoch	
	Teachers	dr hab. inż. Grzegorz Szwoch	

Lesson types

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

Accomplishing projects students will gain practical knowledge and experience in operating, programming DSP platforms and operating DSP development environment. In addition, students should learn the basics related to the analysis of technical documentation and learn to review the state of the art associated with the topic. Due to the nature of the subject , students will improve the ability to work in a team. Good work organization and self-discipline is also desirable.

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	The student is able to write a program realizing basic digital signal processing operations (digital filtering, spectral analysis, detection of signal components) and run it on a digital signal processor.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	The student is able to write a program realizing basic digital signal processing operations (digital filtering, spectral analysis, detection of signal components) and run it on a digital signal processor.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents

Course content – lecture
1. Learning the Texas Instruments C5535 platform
2. Implementation of FIR filter
3. Implementation of IIR filter
4. Implementation of spectral analysis
5. Testing the developed programs
6. Presentation

<table>
<tr><td>Prerequisites and co-requisites</td><td></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>Project</td><td>51.0%</td><td>100.0%</td></tr>
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</td></tr>
<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 BCT 2007, Original in English</td></tr>
<tr><td>Supplementary literature</td><td>A. Leśnicki: Technika cyfrowego przetwarzania sygnałów, Wydawnictwo Politechniki Gdańskiej, 2014</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">During the course, students carry out a project in groups of 3 - 4 persons. Each project group at the beginning of the semester receives an evaluation platform TMS320C5535 contains digital signal processor from Texas Instruments. Students get approx. 20 design topics proposed by the teacher, but it is suggested that the project groups have proposed their own topics that are in interests of group members.

Topics include simple algorithms that require signal processing (usually audio, but depending on the topic can be any digital data). The implementation of the algorithm is done using C / C ++ development environment: Code Composer Studio.

The result of the team's work should be properly working DSP algorithm running on a digital signal processor (depending on the chosen topic, you may be required to implement the same algorithm in MATLAB to verify the results).</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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