GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced Processing of Telecommunications Signals - Laboratory, PG_00048360		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Teleinformation Networks -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	mgr inż. Jacek Litka	
	Teachers	mgr inż. Jacek Litka	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

Practical familiarization with selected advanced digital signal processing techniques encountered in digital telecommunications.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions	In the scope of the subject of laboratory exercises, student analyzes advanced signal processing algorithms and examines the obtained signals, interprets them and based on them draws conclusions about algorithm's correctness, its properties and accuracy.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K7_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	In the scope of laboratory tasks, the student plans and carries out measurements and on the basis of obtained results modifies computer implementations of digital signal processing algorithms.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents

1. Classic sample rate conversion - interpolation and decimation filters design.
2. Interpolation and decimation filters - poliphase decomposition.
3. Multistage sample rate conversion.
4. Incommensurate sample rate conversion.
5. I-FIR filters and their applications.
6. Multichannel modulator and demodulator.
7. Spectrum spreading techniques – FHSS and DSSS.

Prerequisites and co-requisites

Advanced processing of telecommunication signals (E:37037W0)

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Activity</td><td>0.0%</td><td>10.0%</td></tr>
<tr><td>Written peports from laboratory tasks</td><td>50.0%</td><td>70.0%</td></tr>
<tr><td>Presentation of results of completed laboratory tasks</td><td>50.0%</td><td>20.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Fredric J. Harris: Multirate Signal Processing for Communication Systems, Prentice Hall, 2004
2. John G. Proakis, Dimitris K. Manolakis: Digital Signal Processing, Prentice Hall, 2006
3. Andrea Goldsmith: Wireless Communications, Stanford University, California, 2005</td></tr>
<tr><td>Supplementary literature</td><td>1. P. P. Vaidyanathan: Multirate Systems And Filter Banks, Prentice Hall, 1992
2. Ronald E. Crochiere, Lawrence R. Rabiner: Multirate Digital Signal Processing, Prentice Hall, 1983
3. M. Ibnkahla Ed., Signal Processing for Mobile Communications Handbook, CRC Press, 2004</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2"></td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>