

Digitization problems - course description

General information	
Course name	Digitization problems
Course ID	11.3-WE-INFD-DP-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Computer Science
Education profile	academic
Level of studies	Second-cycle Erasmus programme
Beginning semester	winter term 2021/2022

Course information	
Semester	2
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">dr inż. Andrzej Popławski

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade
Project	15	1	-	-	Credit with grade

Aim of the course

To provide basic knowledge about data digitization. To provide understanding of the role of digital data processing techniques in technique and society development. To provide basic skills in modeling of systems for digital data processing, filtering and compression. To provide basic skills in using compression techniques of images and video sequences.

Prerequisites

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Scope

Acquisition and storage of digital data. Sampling, A/D conversion. Elementary types of digital signals, digital signal ambiguity, filter concept. Analysis in the time domain.

Acquisition of digital data. Converters, digital signal representation.

Modeling of digital systems. Components of the digital data processing system, mathematical modeling of digital data processing systems.

Representation of the signal in the digital system. Decoding, quantizing. Fourier transform. Analysis in the frequency domain. DCT and DWT transformation.

Digital data processing algorithms.

Compression of data: assumptions, classification of methods and algorithms, examples.

Wavelet and hybrid codecs of video sequences.

Subjective and objective measures of quality of image compression.

Teaching methods

Lecture, laboratory exercises, project.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Has the basic knowledge in the area of signal processing techniques		<ul style="list-style-type: none">a preparation of a research paperan exam - oral, descriptive, test and other	<ul style="list-style-type: none">Lecture
Can select and use signal processing techniques in digital information systems		<ul style="list-style-type: none">a quizan ongoing monitoring during classescarrying out laboratory reports	<ul style="list-style-type: none">Laboratory
Can think and act in a creative and entrepreneurial way		<ul style="list-style-type: none">a project	<ul style="list-style-type: none">Project

Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the final test and oral presentation .

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Project - the passing condition is to obtain a positive mark from the final report

Calculation of the final grade: lecture 40% + laboratory 30% + project 30%

Recommended reading

1. Sayood K.: Introduction to Data Compression, Elsevier Science & Technology, 2017.
2. Lyons R.G.: Essential Guide to Digital Signal Processing, Pearson Prentice Hall Computin, 2014.
3. Ohm J.R.: Multimedia Communication Technology, Springer, 2004.

Further reading

1. ISO/IEC International Standard 23008-2: 2015 (ed. 2), ITU-T Recommendation H.265: High efficiency video coding, 2015.
2. ISO/IEC International Standard 13818: Information Technology - Generic Coding of Moving Pictures and Associated Audio Information, 1994.

Notes

Modified by dr inż. Andrzej Popławski (last modification: 21-07-2021 11:52)

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