



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Introduction to multimedia [S1MiKC1E>WdM]

Course

Field of study	Year/Semester
Microelectronics and Digital Communication	2/4
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	English
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
24	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

4,00

Coordinators

prof. dr hab. inż. Marek Domański
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Lecturers

Prerequisites

Physics: fundamentals of photometry. Digital signal processing: sampling, impulse response and transfer function of LSI systems, FIR filters. Fourier transform of sampled signals, digital Fourier transform. Introduction to radiocommunications: source and channel coding, spectral efficiency of a transmission system, channel throughput.

Course objective

Basic knowledge on multimedia data acquisition, representation and transmission, and perception of image/video/audio. Understanding of basic problems, limitations and possibilities related to the abovementioned problems.

Course-related learning outcomes

Knowledge:

The student knows the basic principles of acquisition, representation, processing, compression, and transmission of multimedia data, including images, vision, and audio. [K1_W10]

Skills:

The student is able to analyze and interpret issues related to the acquisition, representation, and transmission of multimedia data and assess the limitations and possibilities associated with the perception of images and sounds. [K1_U08]

The student can apply basic methods of image and vision processing, including filtering, quality enhancement, and spectral analysis of image signals. [K1_U07, K1_U10]

Social competences:

The student understands the importance of multimedia technologies in modern communication and can evaluate their impact on society, privacy, and quality of life. [K1_K05]

The student is able to work in a team on the analysis and evaluation of multimedia technologies and present conclusions in a clear and understandable manner. [K1_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Examination in written form. Grading scale: <50% - 2.0 (ndst); 50% to 59% - 3.0 (dst); 60% to 69% - 3.5 (dst+); 70% to 79% - 4.0 (db); 80% to 89% - 4.5 (db+); 90% to 100% - 5.0 (bdb).

Laboratory, credit by written reports and colloquium. Grading scale: <50% - 2.0 (ndst); 50% to 59% - 3.0 (dst); 60% to 69% - 3.5 (dst+); 70% to 79% - 4.0 (db); 80% to 89% - 4.5 (db+); 90% to 100% - 5.0 (bdb).

Programme content

Acquisition, representation, transmission and perception of image, video and audio.

Course topics

Picture perception. Image/video representation. Image/video spectrum. Image/video sampling. Colors. Stereoscopy. Cameras. Displays. Contrast enhancement. Linear and nonlinear image filtering. Introduction to image/video processing. Introduction to image and video compression. Introduction to representation and compression of audio and speech.

Teaching methods

Lecture with examples. Laboratory exercises that demonstrate selected topics considered in lectures.

Bibliography

Basic:

M. Domański, Obraz cyfrowy, WKiŁ, Warszawa 2010.

Additional:

A. Czyżewski, Dźwięk cyfrowy, AOW Exit, Warszawa 2001.

R. Tadeusiewicz, Sygnał mowy, WKiŁ, Warszawa 1988.

A. Beach, Kompresja dźwięku i obrazu wideo Real World, Helion, 2009.

Cyfrowe przetwarzanie sygnałów w telekomunikacji, Praca zbiorowa, red. T. Zieliński, PWN, Warszawa 2014.

B. Cyganek, Komputerowe przetwarzanie obrazów trójwymiarowych w programie Matlab, EXIT, Warszawa 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	104	4,00
Classes requiring direct contact with the teacher	54	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00