COURSE DESCRIPTION CARD - SYLLABUS

Course name
Multimedia Communications [S1EiT1E>TM]

Course

Field of study
Electronics and Telecommunications

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Has a systematic knowledge, together with necessary mathematical background, of basic digital signal processing methods. General knowledge and skills on multimedia, in particular image representation, processing, coding and transmission. Is able to determine basic parameters and properties of signals and telecommunication systems, under predefined constraints. Is able to perform typical calculations and use appropriate software to design and analyze the operation of digital signal processing systems. Demonstrates responsibility for designed electronic and telecommunication systems. Is aware of the hazards they pose for individuals and communities if they are improperly designed or produced. Is aware of the limitations of his/her current knowledge and skills; is committed to further selfstudy.

Course objective

The course covers the state-of-the-art in techniques, methods of analysis and technical solutions in video, audio and speech processing, coding and transmission as well as in multimedia protection, retrieval, and streaming in the context of multimedia systems and communication networks.

Course-related learning outcomes

Knowledge:

Has a systematic knowledge, together with necessary mathematical background, on video, audio and speech processing, coding and transmission as well as on multimedia protection, retrieval, and streaming in the context of multimedia systems and communication networks.

Skills:
Student is able to solve basic problems related to the state-of-the-art in techniques, methods of analysis and technical solutions in video, audio and speech representation, coding and transmission as well as in multimedia protection, retrieval, and streaming in the multimedia systems and communication networks.
Is able to write software for basic computational algorithms, using popular programming languages (e.g. Matlab, C).

Social competences:
Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study. Is aware of the main challenges facing electronics and telecommunication in the 21st century. Is aware of the impact electronics and ICT systems and networks will have on the development of the information society.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The knowledge acquired in the lecture is verified on the written and / or oral exam. The exam consists of several open questions with different levels of difficulty with the assigned number of points. The questions relate to the content presented during the lectures. Credit threshold: 50% of points.

Laboratory - the knowledge of students is verified through the ongoing assessment of student activity during laboratories and/or through the reports of tasks performed during the laboratories. Performed tasks are related to the processing and encoding of audiovisual data. Credit threshold: 50% of points.

Programme content

Lecture:
Fundamentals of video compression and transmission,
Fundamentals of audio perception, representation, processing, compression and transmission,
Speech processing and coding,
Error protection, error concealment for video and audio transmission,
Multimedia streaming,
Watermarking and IP management,
Multimedia description,

Laboratory:
Still image codecs, Video coding technologies comparison (MPEG2/AVC/HEVC), Predictive Audio Coding, Audio Transform Coding, Audio Subband Coding, Audio Codecs Comparison

Teaching methods

Lecture - multimedia presentation, illustrated with examples on the board. Slides available to students after the lecture.
Laboratory - computer classes using software that allows advanced simulation and analysis of audiovisual signals. Solving problems given by the teacher and / or specified in the laboratory instruction. Interpretation of the received solution and drawing conclusions.

Bibliography

Basic
V. Madisetti (ed.), Video, Speech, and Audio Signal Processing and Associated Standards (The Digital Signal Processing Handbook, Second Edition), CRC Press, 2009
J-R. Ohm, Multimedia Communication Technology: Representation, Transmission and Identification of Multimedia Signals (Signals and Communication Technology), Springer, 2004
E. Carne, Connections for the Digital Age: Multimedia Communications for Mobile, Wiley, 2011

Additional
D. Karwowski, T. Grajek, et al., 20 Years of Progress in Video Compression - from MPEG-1 to MPEG-H HEVC. General View on the Path of Video Coding Development, Image Processing and Communications Challenges 8, Springer International, 2016, pp. 3-15
J. Siast, J. Stankowski, T. Grajek, M. Domański, Digital Watermarking with Local Strength Adjustment for AVC-Compressed HDTV Bitstreams, 30th Picture Coding Symposium, PCS 2013, San Jose, USA

Breakdown of average student's workload

	Hours	ECTS
Total workload	0	0,00
Classes requiring direct contact with the teacher	0	0,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	0	0,00