COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to multimedia [S1Cybez1>WdM]

Course

Field of study
Cybersecurity

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
24

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Tomasz Grajek
tomasz.grajek@put.poznan.pl

Lecturers

Prerequisites

Basic knowledge of the fundamentals of programming, digital technology and the ability to obtain information from indicated sources, including sources in English.

Course objective

To provide basic knowledge on the perception, representation, processing and compression of images, video, audio and speech, as well as solving simple problems related to the aforementioned issues. To discuss selected representative methods of compression of multimedia signals, especially the most commonly used in practice, taking into account elements of knowledge in the field of standardisation of multimedia techniques.

Course-related learning outcomes

Knowledge:
K1_W05 - Has advanced knowledge of complex data structures, including their storage, processing, and transmission.
K1_W013 - Has expanded knowledge in the field of multimedia data compression.

Skills:
K1_U01 - Is able to use literature sources, integrate obtained information, evaluate it and make interpretations and conclusions, in order to solve complex and untypical problems in the area of cyber security.
K1_U09 - Is able, using appropriately selected methods and tools, to critically analyse and evaluate the functioning of existing solutions used in software, data processing and computer systems and networks.

Social competences:
K1_K01 - Understands the importance of improving professional, personal and social competences; is aware that knowledge and skills in the area of cyber security evolve rapidly.
K1_K02 - Understands the importance of knowledge in solving cyber security problems; is aware of the need to use expert knowledge when solving engineering tasks beyond own competence.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written exam, closed questions (test)/open questions,
Laboratories - the final mark consists of: substantive assessment of the performance of laboratory tasks, continuous assessment, in each class (oral answers), marks obtained on written tests, obtaining additional points for activity during classes. The points add up.
Grading scale: <=50% 2.0; 51%-60% 3.0; 61%-70% 3.5; 71%-80% 4.0; 81%-90% 4.5; 91%-100% 5.0
The relationship between the grade and the number of points is defined by the Study Regulations. Additionally, the course completion rules and the exact passing thresholds will be communicated to students at the beginning of the semester through the university's electronic systems and during the first class meeting (in each form of classes).

Programme content

Basic knowledge of the perception, representation, processing and compression of video and audio. Solving simple problems related to the issues mentioned. Discussing selected, representative methods of compressing multimedia signals, taking into account elements of knowledge in the field of standardisation of multimedia techniques.

Course topics

- Introduction to multidimensional signal processing.
- Video signals - perception and representation.
- Fundamentals of still image processing, analysis and compression.
- Fundamentals of processing, compression and streaming of moving images.
- Fundamentals of processing, analysis and compression of audio signals.
- Multimedia data retrieval.

Teaching methods

Hybrid lecture: traditional lecture with the addition of multimedia learning materials, problem-based lectures - case studies, it is possible to invite speakers from industry or science
Laboratory - computer-based activities using software allowing advanced simulation and analysis of signals and audiovisual systems. Solving problems given by the instructor and/or specified in the laboratory manual. Interpretation of the solution obtained and drawing conclusions.

Bibliography

Basic:
Domański M., Obraz cyfrowy, WKiŁ, Warszawa, 2010,
Czyżewski A., Dźwięk cyfrowy. AOWExit, Warszawa 2001,
V. Madisetti (ed.), Video, Speech, and Audio Signal Processing and Associated Standards (The Digital Signal Processing Handbook, Second Edition), CRC Press, 2009

Additional:
E. Carne, Connections for the Digital Age: Multimedia Communications for Mobile, Wiley, 2011,
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,

Breakdown of average student's workload

	Hours	ECTS
Total workload	109	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)	55	2,00