COURSE DESCRIPTION CARD - SYLLABUS

Course name
Multimedia Communications [S1Teleinf1>TM]

Course

Field of study
Teleinformatics

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

The student starting this course should have basic knowledge of the basics of telecommunications, digital signal processing and introduction to multimedia. He should have the ability to perform calculations using a mathematical apparatus in the field of mathematical analysis and probability calculus, and to obtain information from the indicated sources. He should also understand the need to expand his competences. In addition, in the field of social competences, the student must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

1. Provide students with basic knowledge in the field of multimedia telecommunications. 2. Developing students' skills in solving basic problems related to the construction and operation of multimedia telecommunications systems. 3. Shaping students' skills in acquiring knowledge about digital systems in the field of multimedia telecommunications.

Course-related learning outcomes

Knowledge:
1. Has a structured, mathematically based knowledge of the basics of telecommunications theory

necessary to understand, analyze and evaluate the operation of modern digital teleinformatic networks for the transmission of multimedia data. K1_W08
2. Has a basic and structured knowledge about the construction, operation and evaluation of the efficiency of teleinformation networks as well as their standards and development directions from the point of view of the development of multimedia telecommunications. K1_W10
3. Has knowledge of the structure and operation of ICT systems for the provision of multimedia services, including processing, compression and transmission of images, audio and speech, as well as searching, securing and using multimedia content. K1_W20

Skills:
1. Can organize networks and supervise their work, and use technologies that enable safe transmission of multimedia data in ICT networks. K1_U15
2. Can analyze the operation of transmitters and receivers of digital signals and design the basic blocks of the transmitter and receiver in digital multimedia data transmission systems. K1_U08
3. Can define the basic requirements for teleinformation systems providing multimedia services, implement in multimedia systems the most commonly used effects of three-dimensional graphics and design image and sound transmission systems. K1_U26

Social competences:
1. Notices changes resulting from technological progress and understands the need to learn about new standards of ICT networks, especially in multimedia applications. K1_K01
2. He knows the limitations of his own knowledge and understands the need to update it. It is open to the possibility of continuous training and improvement of professional, personal and social competences. K1_K02
3. Has a sense of responsibility for the designed ICT systems and is aware of social risks in the event of inadequate design or implementation. K1_K08
4. Understands the importance of shaping the information society for the development of the country. K1_K09

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

a) in the lecture, verification of the assumed learning outcomes is carried out by:
• assessment of the knowledge demonstrated during the exam. The exam is about answering questions and solving problems. To get the grade 3.0 it is necessary to get a minimum of 50% of the points; 3.5 - 60% of points; 4.0 - 70% of points; 4.5 - 80% of points; 5.0 - 90% points.
b) in the laboratory, verification of the assumed learning outcomes is carried out by:
• evaluation of the performance of laboratory tasks,
• obtaining additional points for activity during classes.

Programme content

1. Multimedia telecommunications
2. Review of multimedia telecommunications systems
3. Selected network issues
4. Streaming the multimedia data
5. Image and audio coding
6. Correction of transmission errors
7. Transmission of omnidirectional images
1. Multimedia telecommunications
The importance of the issue
Overview of multimedia transmission problems
The multitude and variety of data sources and receivers
Compatibility and standardization issues
2. Review of multimedia telecommunications systems
Television services
Cable television
Terrestrial television
Satellite television
Digital radio (DAB)

Internet services
IPTV
Streaming media: Youtube, Netflix, Spotify
Local network
DLNA
Chromecast
Cellular network
3. Selected network issues
Types of transmission
Unicast, multicast, broadcast
Types of packages
TCP, UDP, RTP
Supply networks
4. Streaming multimedia data
Examples of efficient streaming methods, in particular MPEG DASH (Dynamic Adaptive Streaming over HTTP), Apple HLS, Microsoft Silverlight
5. Image and audio coding
Selected coding issues
6. Correction of transmission errors
Overview of the most common transmission errors
Correction methods
Spatial methods
Time methods
Source correction
Channel correction
7. Transmission of omnidirectional images
Introduction to virtual reality

Course topics

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Teaching methods

Lecture supported by the presentation of slides and examples of audio, images, and videos.

Bibliography

Basic:
D. Bull – Communicating Pictures, Elsevier, 2014
B. Bing – Next-Generation Video Coding and Streaming,Wiley, 2015

Additional:
M. Domański – Obraz cyfrowy, Wydawnictwa Komunikacji i Łączności WKŁ, 2011
D. Karwowski – Zrozumieć kompresję obrazu, www.zrozumieckompresje.pl, 2019
L. Chariglione – The MPEG Representation of Digital Media, Springer, 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	86	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	41	1,00