GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Multimedia Systems and Terminals, PG_00048132		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Andrzej Czyżewski	
	Teachers	prof. dr hab. inż. Andrzej Czyżewski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	30	3.0	42.0	75

Subject objectives	Presenting fundamentals of audio and wideo compression and resulting file formats. Explaining protocols of multimedia transmission. Familiarization with issues related to the creation of APIs using integrated development environments. Teaching practical skills in programming and in configuring multimedia transmission systems, including the creation of voice IP, teleconferencing calls made using stationary and mobile terminals. Explaining fundamentals of data acquisition technology and principles of preservation of rights to the content.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] Knows and understands, to an advanced extent, methods of supporting processes and functions, specific to the field of study	The student understands the principles of interaction of stationary and mobile terminals in the context of processes related to the implementation of data exchange functions, building services and applications based on network resources, estimating the availability of computational power and choosing the rules of division of tasks between local hardware resources and fog computing services and cloud applications.	[SW1] Assessment of factual knowledge
[K6_W35] Knows the concepts of the technique of signal transmission, operation of telecommunications networks and multimedia services and the rules for providing them	The student knows the principles of building multimedia applications, data transmission protocols, in particular sound and image, which are used in data exchange processes between terminals and the network environment.	[SW1] Assessment of factual knowledge
[K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	The student knows and distinguishes the architecture of computer systems. He can divide software into layers, starting from firmware, through middleware and high-level software related to application programming. The student uses scripting languages and API programming interfaces.	[SW1] Assessment of factual knowledge
[K6_U31] can identify telecommunications network architectures, differentiates their areas and functional elements, evaluates the quality of service delivery, calculates parameters of functional elements	The student knows and can apply quality measures relating to multimedia content, both objective and subjective. He knows the definitions of distortions of sound and image. Understands the principles of subjective quality measurements. Is able to determine the impact of transmission quality on the achieved values of the Quality of Service and Quality of Experience parameters.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information

Subject contents

1. Introduction. History of multimedia communication development. Service synchronising in multimedia systems. Quality of transmitted multimedia content. 2. Multimedia content types and elements. Hypermedia, interactive media. Hypertext features, HTML, XML, XHTML. 3. Script languages: PHP (hypertext preprocessor), JAVA Script. Formats of audio, computer graphis and video transmission. 4. Multimedia programming interfaces API. Review of standards and tools available on various platforms and operational systems. 5. Modular multimedia applications in the ISDN standard 6. Multimedialne software implemented to BRI i PRI interfaces 7. Multimedia transmission. Selected platforms and protocols. IPv6 (Internet Protocol Version 6) as a service delivery protocol. VOD (Voice Over Data). Architecture and implementations: ATM (VoATM), IP (VoIP). Standard H.323. SIP. Multimedia Messaging Service (MMS). 8. Quality of multimedia transmission. Quality of Service. Objec-tive and subjective quality of transmission - synchronous, asyn-chronous and isochronous. Delay, jitter, packet loss, isolated and sequential errors. Methods of quality assessment – objective and subjective measurements. Distortions, parasite artefacts and noise. Sound quality evaluation. Speech intelligibility and clarity. Methods for image and video quality assessment. 9. Recording and broadcasting of multimedia content. Multimedia studio and broadcasting system. Recording media (magnetic, optical, magnetooptical). Broadcasting vs. multicasting. Water-marking and Digital Rights Management. 10. Multimedia servers. Configuration and organisation of multime-dia servers. Management of multimedia content – technology and QoS issues. 11. Multimedia terminals. Videophone. Universal headset with inte-grated services. Multimedia workstation. Set-top-box. 12. Audio & video rendering. Image and video rendering; graphic animation. Surround sound, displays and projectros (panoramic and stereoscopic projection). Man-machine interfaces. Multimo-dal interfaces. 13. Videoconferencing. Organisation principles, configuring, selec-tion of transmission channels. Videoconference terminals. MUD (Multi User Domain) – interactive muti-user environments. Se-lected systems: VideoTalks (AT&T). 14. Advanced multimedia services. Video/News on Demand, Nearly Video on Demand, on-line services, distance learning, transac-tion services, telemedicine. 15. Services in mobile 2G and 3G systems. HF band usage. Delivery services in the interactive broadband networks. Lecture recapitula-tion and future development prospects. Virtual reality and telepresence systems.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	51.0%	50.0%
Written exam	51.0%	50.0%

Recommended reading	Basic literature	Andrzej Czyżewski: Dźwięk cyfrowy. Wybrane zagadnienia teoretyczne, technologia, zastosowania. Exit, 2001, ISBN: 978-83-87674-08-3, Kategorie: Informatyka, Multimedia, Dźwięk cyfrowy, 552 strony, format B5; Alicja Wieczorkowska: Multimedia. Podstawy teoretyczne i zastosowania praktyczne., PJWSTK, 2008, ISBN: 978-83-89244-67-3, Kategorie: Informatyka, Multimedia, 336 stron; Anna Korzyńska, Małgorzata Przytulska: Przetwarzanie obrazów. Ćwiczenia., PJWSTK, 2006, ISBN: 978-83-89244-37-6, Kategorie: Informatyka, Multimedia, Zawiera CD, 110 stron
	Supplementary literature	materiały i artykuły w zbiorach bibliotecznych KSMM
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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