GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Multimedia Data Exchange and Storage, PG_00068232		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	5	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jacek Rumiński	
	Teachers	prof. dr hab. inż. Jacek Rumiński	

Lesson types

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

The aim of the subject is for the student to acquire skills in the implementation of tasks related to the exchange of data in health care information systems and to acquire knowledge of standards and methods, the knowledge of which is crucial in the development of the indicated skills.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 has acquired knowledge in the following areas: - construction of multimedia medical data structures (DICOM, HL7), - interpretation of the multimedia medical data recording format (DICOM, HL7), - methods of multimedia data compression, - requirements for multimedia data exchange systems, taking into account limitations in medicine, - construction of data exchange systems based on PACS systems.	[SW1] Assessment of factual knowledge
[K6_U07] can apply methods of process and function support, specific to the field of study	The student has acquired the ability to: - interpret the format of multimedia medical data (DICOM, HL7), - design data structures for multimedia medical data (DICOM, HL7), - select multimedia data compression methods, - design multimedia data exchange systems taking into account limitations in medicine, - interpret standards and recommendations in the field of multimedia data storage and exchange.	[SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Objectives and methods of multimedia data exchange in medicine - introduction. Information systems in medicine - classification and architecture of systems.Introduction to multimedia data compression.Image compression using JPEG and JPEG 2000 methods,Video compression using MPEG family methods,MPEG 7 multimedia data representation. Multimedia data representation - use of deep learning methods for data representation.Medical data exchange standards: DICOM - data representation.Medical data exchange standards: data visualization. Medical data exchange standards: DICOM - data exchange.Medical data exchange standards - use in PACS systems.Medical data exchange standards: HL7 up to version 2.X,Medical data exchange standards: HL7 in version 3.0: RIM, CDA and their application in clinical systems,Medical data exchange standards: HL7 FHIR.

Laboratory:

Data exchange and interpretation in hospital information systems (HL7) Interpretation and visualization of image data in PACS systems (DICOM) Image data exchange in PACS systems (DICOM) Data anonymization, sharing and processing of DICOM data. JPEG data compression and image quality assessment metrics</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge and skills in the area of computer program construction, program design and computer program implementation. Knowledge and skills in the area of basic digital image representation.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>51.0%</td><td>60.0%</td></tr>
<tr><td>Practical exercise</td><td>50.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>HL7, norma i dokumenty HL7, dostęp: http://www.hl7.org K. R. Rao and P. Yip, Discrete Cosine Transform: Algorithms, Advantages, Applications (Academic Press, Boston, 1990). Materiały do przedmiotu opracowane w formie edukacji na odległość, dostęp: http:// uno.biomed.gda.pl Metody i urządzenia do archiwizacji danych: http:// www.storagestandard.pl/ N. Ahmed, T. Natarajan, and K. R. Rao, "Discrete Cosine Transform", IEEE Trans. Computers, 90-93, Jan 1974. NEMA, Norma DICOM, dostęp: http://medical.nema.org Skrypt z materiałami do przedmiotu Wymiana i składowanie danych multimedialnych</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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