



Subject card

Subject name and code	3D Spatial Data Visualisation, PG_00067294						
Field of study	Informatics						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2029/2030		
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	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Geoinformatics -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marcin Kulawiak					
	Teachers	dr hab. inż. Marcin Kulawiak dr inż. Marek Kulawiak					
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		17.0	50
Subject objectives	The goal of the lecture is to present algorithmic and programming methods of three-dimensional visualization of spatial data.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W44] knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human-computer interaction, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining as well as standards and methods of IT systems administration, monitoring of processes and robustness to undesirable phenomena and activities	The student knows and understands the basic methods of generating 3D computer graphics.	[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 the available methods and programming techniques supporting the creation of three-dimensional visualization of spatial data.	[SW1] Assessment of factual knowledge
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	The student knows and understands the basic operations necessary for the construction of three-dimensional visualization of spatial data.	[SW1] Assessment of factual knowledge
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	The student is able to create a simple system of three-dimensional visualization of spatial data.	[SU4] Assessment of ability to use methods and tools
Subject contents	<p>Course content – lecture</p> <p>3D graphics pipeline review of hardware and software. Coordinate systems for spatial data. Theory of viewpoint calculation and camera navigation. Coordinate systems for spatial data. Spatial data programming using OpenGL standard. Methods of generating 3D graphics. 3D graphics in WWW browsers. WebGL, Cesium.</p>		
	<p>Course content – laboratory</p> <p>Introduction to stereoscopy. Introduction to 3D scene definition. Viewpoint calculation and camera navigation. Spatial data texturing. Elements of spatial data programming using OpenGL standard. 3D graphics in WWW browsers. WebGL, Cesium.</p>		
Prerequisites and co-requisites	Object Oriented Programming.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	60.0%	50.0%
	Exam	60.0%	50.0%

Recommended reading	Basic literature	Richard S. Wright, Benjamin Lipchak, Nicholas Haemel: OpenGL SuperBible: Comprehensive Tutorial and Reference Addison-Wesley Professional; 5 edition (August 2, 2010)
	Supplementary literature	Parisi, T., 2012. <i>WebGL: up and running</i> . " O'Reilly Media, Inc."
	eResources addresses	
Example issues/ example questions/ tasks being completed	Building a three-dimensional visualization of data via anaglyphs. Creating a three-dimensional Geographic Information system in Web technologies.	
Practical activities within the subject	Not applicable	

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