

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00030017								
Field of study	Mathematics								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2023/2024			
Education level	second-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	1		Language of instruction			Polish			
Semester of study	2		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form		assessment				
Conducting unit	Institute Of Physics And Applied Computer Science -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej								
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bartosz Reichel						
	Teachers		dr inż. Bartosz Reichel						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	15.0	0.0	45.0	0.0		0.0	60	
	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	60		5.0		35.0		100	
Subject objectives	Understanding the basics of of graphics creation pipline on computers,								
	Learning basic operations and transformation (projection, rotation, filling, tessellation)								
Knowledge of basic libraries 3D (OpenGL, DirectX)									
	Getting to know the Unity platform, to create a simple game.								

Learning outcomes	Course outcome	Subject outcome	Method of verification					
[K7_U13] Understands the mathematical foundations of th analysis of algorithms and computational processes, can construct algorithms with good numerical properties, use to solve typical and unusual mathematical problems.		Ability to implement the algorithm eg. Calculating transparency in 3d graphics.	[SU1] Assessment of task fulfilment					
	[K7_W12] Knows well at least one symbolic computation software package and one statistical data processing package.	Creating an application in the selected platform. Eg. Implementing collision algorithm in bouncing ball example	[SW1] Assessment of factual knowledge					
	[K7_W05] Has enhanced knowledge of a selected branch of mathematics: knows most classical definitions and theorems and their proofs, Understands problems being examined, Knows relations between problems from particular field with other branches of mathematics, theoretical and applied	Use of knowledge in practice (task). Game (eg. Bollard) implementation	[SW3] Assessment of knowledge contained in written work and projects					
	[K7_K03] Can work as a team; understands the necessity of systematic work on all projects that are long-term in nature, understands and appreciates the importance of intellectual honesty in one's own activities and the activities of other people; behaves ethically.	Ability to work in a team. Using tools like git.	[SK2] Assessment of progress of work					
Subject contents	- Display Process: how it works on simple graphics card							
	- The process of creating 2D graphics							
	- Bitmaps operations (Terenary raster Operations)							
	- Collision in 2D systems							
	- The process of creating 3D graphics							
	- The importance of basic concepts in 3D graphics (eg camera) and elements associated with them							
	- Shaders (basic)							
	- Collisions in 3D							
	- Physics engine libraries for games							
	- Sound (playback, create / filtering)							
	- Input-output devices (HID devices)							
	- Use of platforms: OpenGL / DirectX, GDI +							
	- Unity Platform.							
Prerequisites and co-requisites								
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade					
and criteria	Implementation of tasks on the laboratory	50.0%	100.0%					
Recommended reading	Basic literature Pro C# 5.0 and the .NET 4.5 Framework,6th Edition,Andrew Troelsen, Apress Graphics Gems (I-V), Academic Press							
	Supplementary literature	Dave Calabrese, Unity 2D Game Development, March 2014, ISBN 139781849692564						
		or a similar from scope of Unity						
	eResources addresses	Adresy na platformie eNauczanie: Programowanie gier komputerowych 2024 - Moodle ID: 37427 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37427						

Example issues/ example questions/ tasks being completed	Implement a simple 2D game (eg. PAC MAN)
Work placement	Not applicable

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