



Subject card

Subject name and code	Introduction to computer graphics and computational geometry, PG_00050169						
Field of study	Mathematics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
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	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Nonlinear Analysis and Statistics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Jakub Maksymiuk				
	Teachers		dr inż. Jakub Maksymiuk				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	E-learning hours included: 0.0 Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6678						
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		0.0		0.0	60
Subject objectives	The aim of the course is to familiarize students with selected topics of computer graphics and computational geometry.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_U11		Student can create and analyze basic algorithms.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	K7_U07		Student is able to apply the methods of linear algebra and geometry in computer graphics.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	K7_W04		Student knows the basic methods and algorithms of computer graphics and computational geometry.		[SW1] Assessment of factual knowledge		
Subject contents	1. Geometric transformations in 2D and 3D. Homogeneous coordinates. 2. Projections in 2D and 3D. 3. Representation of curves and surfaces: Bezier, B-spline and NURBS. 4. Selected topics of rendering: colors, reflections, shading, ray tracing, clipping 5. Data structures in computer graphics. 6. Introduction to computational geometry. 7. Convex hull. Intersections of lines and polygons. Triangulation. 8. Voronoi diagrams. Delunay triangulation. 9. Determining position. Range searching. Motion planning.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Project assignments		50.0%		100.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. D. Marsh, <i>Applied geometry for computer graphics and CAD</i>, Springer Science & Business Media, 2006 2. M. de Berg, O. Cheong, M. van Kreveld, M. Overmars, <i>Computational Geometry. Algorithms and Applications. Third Ed.</i>, Springer Science & Business Media 2008
	Supplementary literature	brak
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	<p>Create an algorithm drawing a given shape using the given primitives.</p> <p>Describe Bezier curves.</p> <p>Propose and analyze the algorithm finding the points of intersection in the set of intervals.</p>	
Work placement	Not applicable	