

Subject card

Subject name and code	3D Animation, PG_00168139						
Field of study	Informatics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish If necessary, the course can be conducted in English.		
Semester of study	2		ECTS credits		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Piotr Arłukowicz				
	Teachers		dr Piotr Arłukowicz				
Lesson types	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						
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 teach students how to create 3D computer animations. The course covers the fundamentals of animation, including Disneys 12 Principles of Animation, constraint systems, drivers, simulations, and methods for animating shapes in synchronization with sound. Topics include skeletal and procedural animation, as well as techniques for composing complex animations from simple individual actions. The course also features a module on working with Motion Capture, where the use and application of mocap data for character movement are discussed. Additionally, students learn how to render and edit animated films.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFMU2_K01] knows the limits of his own knowledge and understands the need for further learning		The student is able to create an animation in a chosen style, using techniques and workflows discussed in the course and aligned with established professional standards.		[SK2] presentation/project/paper/report [SK6] demonstration of practical skills		
	[INFMU2_U10] is able to determine the directions of further learning and implement the process of self-education		The student understands the principles of animation creation, including animations based on keyframes for various parameters as well as those generated through simulations.		[SU2] presentation/project/paper/report		

Subject contents	The course begins with foundational topics: • Review (or introduction) to 3D graphics and the Blender software environment. • Keyframe-based animation: controlling timing, speed, and movement dynamics. • Practical exercises in basic motion: circular, eight-shaped, spiral paths; bouncing ball falling down the stairs. • Constraints and limitations: controlling motion through motion, parameter transfer between objects, creating dependent animations. Exercise: crank-driven motion like steam locomotive wheels. • Drivers: advanced control of dependent motion, modeling and animating a planetary gear system. Optional challenge: animating a Cardan joint. • Introduction to bone-based (armature) animation systems. • The 12 Principles of Animation (as defined by Disney). • Motion modeling using Squash & Stretch: animating a ball with personality. • Forward and inverse kinematics: modeling arm movement using FK/IK systems, with custom properties and drivers. • <i>Optional</i>: modeling and rigging a foot. • Full-body rigging with Rigify, and walk cycle animation. • Non-Linear Animation (NLA) and composing animations from action clipse.g., animating a character walking a patrol route while performing secondary actions (exercises, clapping, waving, etc.). • Shapekeys, lip-syncing, and facial animationenabling characters to speak, blink, and express emotion. • Introduction to Rigid Body simulations. • <i>Optional</i>: Soft Body simulations, deformations, elasticity, cloth simulation (clothing, flags in the wind, etc.). • <i>Optional</i>: Fluid simulationswater, smoke, fire, explosions. • <i>Optional</i>: Dynamic painting simulationsdents, waves, trails, scratches, and similar effects.		
Prerequisites and co-requisites	Basic computer literacy is required. Completion of a prior course in 3D Graphics or a similar subject, and/or familiarity with 3D animation software, is highly recommended.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	partial assignments	51.0%	33.0%
	project	51.0%	67.0%
Recommended reading	Basic literature	Tony Millen: Introducing Character Animation with Blender, John Wiley & Sons, ISBN13 9780470427378, ISBN10 047042737X	
	Supplementary literature	Miguel Angel Manrique: Blender for Animation and Film-Based Production, Apple Academic Press Inc., EAN 9781482204742, ISBN 1482204746	
	eResources addresses	Basic https://polskikursblendera.pl - Polish Blender Course Supplementary https://inf.ug.edu.pl/~piotao/zajecia/sylabusy/animacja/ - Description of 3D Animation class	
Example issues/ example questions/ tasks being completed	Animation of a rocket and a tracking drone.		
	Animation of a person eating at a table.		
	Animation of a person falling into a hole.		
	Animations of text, geometric solids, and geometric transformations.		
	Animations of robots and machines in operation.		
Work placement	Not applicable		

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