Obuda University Alba Regia Faculty				

Name of the subject and Neptun code: Software Tools of Game Development AMXSTGDMNE
  ECTS: 5

Faculty:				
Subject leader:	Éva Hajnal PhD.		Teacher:	Éva Hajnal
Prerequisites				
Weekly hours:	Lecture: 2	gs:0	Lab: 3	Consultation: 0
Way of assessment:	**Exam**			

Description of the subject:

Aim: The aim of this subject to teach the theoretical basis of computer graphics and give a practical knowledge in Unity game development and modelling. Reality. Collision detection. Deformations. Calculations of forces. The students get acquainted with Unity (XNA) and other development framework, its software basics and they get practice in it. Surface properties, physical attributes. Connection between the physical simulation and visualization. The elements of the graphics pipeline and its operation. Resources, memory handling. Graphics card controlling with OpenGL. Shaders. Animations. Water surface and terrain. Particle systems and nets. HDRI, software simulation of depth of field. Graphics card controlling from the console. Object oriented structure of game motors. PhysX. Case study: game development.

Curriculum:

Contents	Hours
Lecture:	
Basic concepts.Game types.	2
Image types, image creation. Main features the object-oriented model of a game engine. Unity, Ogre3D, XNA examples Graphics. Main elements.	2
Coordinates. Coordinate transformations. Homogenous coordinates.	2
Viewing. Types of projections. Perspective. Depth of field and its software simulation.	2
The graphics card, graphics pipeline, DirectX. Resources. Memory handling.	2
Programming of shaders with HLSL. OpenGL. Projection of the movements. Visualization of an environment. Water surface and terrain. Shades. Calculation of physics. Rigid bodies. Collision and collision detection. Particle systems and nets Physical animations	2
Data structures in graphics engines	2
Surface, texture	2
Light effects. Global illumination	2
Ray tracing	2
Animation	
HDRI Case study. FPS game development. Test	2
Practice:	
Game project development with Unity	3
Game framework	3
Unity Visual Scripting	3
Unity Debugging and version handling	3
Moving Objects, Rigidbody	3
Camera and Lighting	3
Unity Testing and Profiling	3
HLSL, OpenGL	3

OpenGL	3
Basic AI and Effects	3
Test	3

Requirements	
	Finish the game development task of the computer laboratory practice
	Written exam at least 50% achievement
	grades 50% - 62% 2 63% - 74% 3 75% - 85% 4 86% - 5

References:	
	1. Steve Marschner: Fundamentals of Computer Graphics ISBN: 13:978-1-4822-2941-7
	2. Alan Thorn: Game Development Principles ISBN 10 : 9781285427065 ISBN 13 : 1285427068
	3. *Penny de Byl: Holistic Game Development With Unity ISBN 10 :* *9781317497233* *ISBN 13 : 1317497236*