3D games programming - course description

General information

Course name	3D games programming
Course ID	11.2-WE-INFP-ProgramG3D-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Computer Science
Education profile	academic
Level of studies	Erasmus programme
Beginning semester	winter term 2017/2018

Course information

Semester	5
ECTS credits to win	6
Course type	optional
Teaching language	english
Author of syllabus	• dr hab. inż. Marek Sawerwain, prof. UZ

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Laboratory	30	2	-	-	Credit with grade
Project	15	1	-	-	Credit with grade

Aim of the course

- to familiarize students with the capabilities of 3D game programming environments, including the most popular development environments designed for game programming developing,
- shaping the basic skills of 3d game programing and create awareness of main notions used in modern 3d game systems.

Prerequisites

Computer graphics, Object oriented programming

Scope

A brief overview of the main stages in the history of computer game development. Especially highlighting the development of 3D interactive graphics.

Existing systems and environments for 3D game programming. Examples of applications/packages supporting the development of applications with interactive 3D graphics.

Interactive computer 3D graphics. Geometric modelling, transformation and navigation in 3D space. Virtual reality as interactive 3D environment. Representation of 3D space. Construction and placement basic 3D elements. Methods of modifying of 3d objects. Representation of 3D objects -- shading and lighting. Mesh construction. Terrain component.

Animation and interactions in 3D game environment. Movement keying, simulation of move based on physics models. System of collision detection. Animation of position, rotating and scale. Interaction of user.

Tools supports of 3D game developing and programming. Performance of real-time applications. Techniques of 3d graphics scene optimization like occlusion culling, level of details. Scripting in 3D game systems.

Selected aspects of networking in 3D games. Server and client creation. Overview of basic algorithms for synchronizing position of player in a 3D environment across the network.

Teaching methods

Lecture: conventional lecture
Laboratory: laboratory exercises, group work
Project: project method, discussions and presentations

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student is able to plan and carry out multi-stage work schedule of 3D game project.		• a test with score scale	• Lecture

Outcome description	Outcomesymbols	Methods of verification	The class form
Student can evaluate of a 3D game application (criticise its contents, technical quality and evaluate the method of its preparing).		• a test with score scale	• Lecture
Can prepare a sample or prototype of computer game in selected development environment		• a project	• Project
Can use advanced features of programming and developing tools for creation of a game with 3D graphics		• a test with score scale • an observation and evaluation of activities during the classes	• Laboratory

Assignment conditions

Lecture - obtaining a positive grade in written exam.
Laboratory - the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project - a condition of pass is to obtain positive marks from all project tasks and preparation written report of project.
Calculation of the final grade: = lecture 30% + laboratory 30% + project 40%.

Recommended reading

1. Vince J.: Virtual Reality Systems, Addison Wesley, Cambridge, 1995.
2. Hocking J.: Unity in Action: Multiplatform Game Development in C# with Unity 5, Manning Publications; 2015.
3. Lintrami T.: Unity 5.x Game Development Essentials, Packt Publishing, 3rd ed., 2017.
4. Rhodes G.: Unity 5.X 2D Game Development By Example, Packt Publishing, 2nd ed., 2017.

Further reading

1. Kalwick D.: Animating Facial Features & Expressions, Charles River Media; 2nd ed., 2006.
2. Creighton R.H, Unity 4.x Game Development by Example: Beginner's Guide, Pack Pub, 2013.
3. Pereira V., Learning Unity 2D Game Development by Example, Pack Pub, 2014.
4. Smith S., Queiroz C., Unity 4.x Cookbook, Pack Pub, 2013.

Notes

Modified by dr hab. inż. Marek Sawerwain, prof. UZ (last modification: 31-05-2017 11:22)