POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Unity Programming [S2Teleinf2-SzIiUM>PU]

Course

Field of study
Teleinformatics

Year/Semester
2/3

Area of study (specialization)
Artificial intelligence and machine learning

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other
14	24	0

Tutorials	Projects/seminars	
0	0	

Number of credit points

4,00

Coordinators

dr inż. Tomasz Grajek
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Lecturers

Prerequisites

Student has a basic knowledge of computer graphics and object-oriented programming.

Course objective

Obtain skills to create interactive applications presenting two- or three-dimensional content using the Unity environment.

Course-related learning outcomes

Knowledge:
He/she has an expanded and in-depth knowledge in the mulimedia processing systems area. K2_W02, K2_W10
Creating a new project and description of its structure. Resource management. Functions and objects in the context of scripting in Unity. Accessing and manipulating object properties. K2_W04, K2_W05, K2_W11
Is familiar with and comprehends advanced artificial intelligence methods applied in multimedia systems including 3D systems. K2_W06, K2_W11
Has knowledge of developmental trends and significant new achievements in the field of multimedia

systems. K2_W07

Skills:
He/she is able to acquire information from literature, databases, and other sources; integrate the obtained information; interpret and critically evaluate it; draw conclusions; and formulate and thoroughly justify opinions, K2_U01, K2_U15
Can utilize learned mathematical methods and models based on Unity physic system, modifying them as necessary, K2_U06, K2_U14
Can create basic scenes and objects and manipulate a three-dimensional environment. Can implement interactions with the user, objects and the environment in a virtual environment. Can animate objects and characters. K2_U07
Can assess the usefulness and feasibility of incorporating new advancements in 3D techniques and design methods of virtual reality for creating innovative solutions for ICT systems. K2_U10, K2_U16, K2_U17

Social competences:
Is ready to recognize the significance of knowledge in solving cognitive and practical problems dealing with virtual reality and to critically evaluate received content. K2_K01
Is ready to think and act rationally. K2_K05

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written or oral examination, open questions with an expected descriptive answer.
Laboratory: assessment of self-performed tasks during the semester and final project.
Grading scale: <50% - 2.0 (ndst); 50% to 59% - 3.0 (dst); 60% to 69% - 3.5 (dst+) ; 70% to 79% - 4.0 (db); 80% to 89% - 4.5 (db+); 90% to 100% - 5.0 (bdb).

Programme content

Lectures:
1. Introduction to the Unity environment - overview of the Unity interface and basic terminology. Creating a new project and description of its structure. Navigating the Unity editor and views. Resource management - importing and organising resources (models, textures, sounds). Working with resource packs and the Asset Store.
2. Scripting in Unity - an introduction to the C# language. Functions and objects in the context of scripting in Unity. Accessing and manipulating object properties.
3. User interaction and control - input/output system.
4. Physics and collision detection - an overview of the Unity physics engine.
5. User interface and menus - user interface design.
6. Sound and visual effects.
7. Artificial intelligence mechanisms.
8. Publishing and distribution
Laboratory:
1. Creation of basic scenes and objects, manipulation of the three-dimensional environment
2. implementation of user interaction, interaction with objects and surroundings in a virtual environment.
3. Animation of objects and characters. Physics and collisions.
4. Creation of user interfaces.
5. Implementation of network functionalities.

Course topics

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Teaching methods

Lecture: multimedia presentation.
Laboratory exercises: implementation of projects in the Unity environment, solving programming problems, implementation of scripts, use of virtual reality goggles.

Bibliography

Basic:
1. J. Hocking, Unity in Action, 3rd edition. Multiplatform game development in C#, Manning, 2022
2. Unity Manual: https://docs.unity3d.com/Manual/index.html
3. Unity Learn: https://learn.unity.com/

Additional:
1. J. Skeet, C# in Depth
2. J. Linowes, Unity Virtual Reality Projects, Packt Publishing, 2015

Breakdown of average student's workload

	Hours	ECTS
Total workload	103	4,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50