2024 / 25

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Module Descriptor

Advanced 3D Game Development (Computing and Mathematics)

Advanced 3D Game Development (A10867)

Short Title: Advanced 3D Game Development
Department: Computing and Mathematics
Credits: 5 **Level:** Advanced

Description of Module / Aims

This module provides students with theoretical and practical concepts for the development of 3D games. This module will provide the students with advanced skills related to the development of 3D games using the Unity Game Engine (or similar software).

Programmes

		stage/semester/status
GAME-0009	BSc (Hons) in Applied Computing (WD_KACCM_B)	4 / 8 / E
GAME-0009	BSc (Hons) in Applied Computing (WD_KCOMP_B)	4 / 8 / E
GAME-0009	BSc (Hons) in Computer Science (WD_KCMSC_B)	4 / 8 / E

Indicative Content

- Texture mapping
- Artificial intelligence
- Design patterns
- Lighting and shaders
- Object-Oriented Programming in C#

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Implement game mechanics using C# (or similar language) and understand how object oriented programming can improve and optimize their game.
2. Manage advanced texturing (bump- or normal mapping), lighting (e.g., global illumination), animations (blend-tree) or AI (ray-casting or group movement) techniques.
3. Compare and apply common design patterns for game development.
4. Integrate a version control system into the development cycle.
5. Develop networked games using built-in networking capabilities.

Learning and Teaching Methods

- Since this module is focused on developing practical programming skills (i.e., game programming for mobile devices), the four contact hours will be delivered in the computer labs in the form of two 2-hour practicals.
- Due to the very practical nature of the skills to be acquired in this module, these practical sessions will be centred around the idea of learning by doing, whereby students develop proficiency in the specified skill set through guided activities, and whereby lecturers provide short formal presentations of relevant concepts and technologies, as well as practical tips, feedback, and best practices.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Practical	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	25%	1,2,3
Assignment	25%	4,5
Assignment	50%	1,2,3

Assessment Criteria

<40%: Inability to understand, explain the workings of or modify, a simple program. Inability to write simple programs using constructs as per learning outcome (3). Inability to use the programming environment to edit, run and debug programs.

40%–49%: Able to understand, explain the workings of or modify a simple program. Able to write simple programs using constructs and data structures as per learning outcome (3). Able to use the programming environment to edit, run and debug programs comfortably. Can produce a prototype of a simple system.

50%–59%: All the above and in addition correctly choose appropriate programming and data structures. Use pre-defined class libraries in programs (e.g. String). Show a high level of competency with programming environment.

60%–69%: In addition, able to apply given solutions to new, similar problems. Starts to reference on-line documentation to examine new constructs, libraries. Starts to see programs in terms of system of components.

70%–100%: All previous to an excellent level. Starts to understand the concept of good solutions.

Supplementary Material(s)

- Nystrom, R. *Game Programming Patterns*. NY: Genever Benning, 2014.
- Okita, A. *Learning C# Programming with Unity 3D*. NY: CRC Press, 2014.

Requested Resources

- Equipment: MAC PCs
- Room Type: Computer Lab