

MODULE DESCRIPTOR

MODULE TITLE	Maths and Technology for Games		
MODULE CODE	CO3303 (L6)	CREDIT VALUE	20 / 10 ECTS
SCHOOL	SCHOOL OF SCIENCE		

MODULE AIMS

1. To discuss and evaluate the latest techniques used in games development.
2. To develop student's abilities to encompass the use of games consoles, their architectures and APIs.
3. To enhance the student's programming with a range of optimisation techniques relevant to games development.
4. To encourage students to remain current with industry-relevant games development techniques

MODULE CONTENT

The games industry is characterised by a constant change in platforms and technologies. A challenge for a prospective games developer is to keep up to date with the latest techniques being used in commercial practice. This module presents the latest advances in games development theory and practice for the latest technologies. The material supports and extends the core games development content delivered in CO3301 (Games Development 2).

The module also explores the relevant maths for advanced techniques, e.g. quaternions.

The module content will be updated to remain in step with the latest developments in the games industry. Consequently the module content must be flexible.

Games Consoles

Games Consoles: Developing for consoles, Console APIs
Console Architectures; Implications for games development

Graphics

Advanced Animation: Quaternion representation; Spherical linear interpolation; Inverse kinematics
Spatial Partitioning: PVS, BSP trees, Quadtrees & Octrees, etc.
Partition usage: Scene Management, Occlusion culling, Sound transmission, etc.
Scene Post-Processing: Depth of field, Motion blur, Heat Haze etc.
Advanced Lighting and Shading, e.g. High dynamic range (HDR) lighting, Batches, Instancing
Linear Dynamics, particle physics, soft body physics
Unusual techniques: Fur, soft shadows

Optimisation for Games

Algorithmic techniques
Using C++ efficiently
Optimising for cache use
Managing memory usage
Balancing optimisation requirements

INTENDED LEARNING OUTCOMES

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

1. Explain and implement a range of contemporary games development techniques.
 2. Investigate and critically evaluate new games development techniques
 3. Apply the skills and knowledge required to program a games console using a suitable API
 4. Analyse and apply balanced optimisation techniques to games programs
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TEACHING METHODS

All the games development techniques covered will be introduced from a programming viewpoint and illustrated practically.

Lectures will present concepts illustrated with examples, and will be used to direct student reading and research into relevant topics. Tutorial sessions will allow students to investigate and apply the material illustrated in the lectures.

Tutorials will be used to reinforce the topics covered in the lecture but will also allow the student to examine and evaluate other possible approaches to these topics. Tutorials will also include the presentation and discussion of student investigation.

The coursework will allow the students to demonstrate their ability to investigate and apply novel techniques to a specific development problem. The examination will assess the students' broader understanding of a range of techniques and their grasp of the relevant knowledge and theory required to deal with practical applications.

ASSESSMENT METHODS

This module is assessed through an examination (50%) and an Advanced Investigative Development (50%).