Anglia Ruskin University

Module Definition Form (MDF)

Module code: MOD004973	Version: 2 Date Amended: 02/Mar/2017

1. Module Title

Simulation in Games

2a. Module Leader

Shabnam Sadeghi Esfahlani

2b. Department

Department of Computing and Technology

2c. Faculty

Faculty of Science and Technology

3a. Level

4

3b. Module Type

Standard (fine graded)

4a. Credits

15

4b. Study Hours

150

5. Restrictions			
Type	**Module Code**	**Module Name**	**Condition**
Pre-requisite:	MOD004123	Analytical Techniques for Game Developers	Compulsory
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	None		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

Video games rely on realistic simulations in many elements of gameplay, for example, the ability to move objects in a realistic manner, detecting collisions, and creating moving vehicles. Understanding the techniques to add realistic simulation into games enables a richer gaming experience and consequently reduces development cost. One of the game developer's challenges is the complexity of simulations in a game which results in great number of interactions that reduces the computation efficiency and takes an immense amount of processing time and power. Real-world motions are based on the rules of physics which can make simulated game worlds appear more natural. Objects will not fall realistically without accurate simulation of gravity, and without the knowledge of momentum, explosions and collisions will not be realistic. An understanding of Newton’s laws of motion provides a great deal of knowledge on which to model the behaviour of moving objects, including collision detection. Collision detection mechanisms relies on a branch of physics that underpins Einstein’s special theory of relativity. While game engines often provide limited capabilities in physics simulation within the engine itself, game developers cannot always be guaranteed to be using an engine in which such capabilities are already provided. It is often the case that even when such basic simulation capabilities are provided, it is necessary to extend or adapt them to the specific requirements of the game. This module will provide students with the ability to examine and differentiate knowledge in the discipline of physics. Students will be able to apply this knowledge in the context of game development to understand, extend basic simulation techniques for themselves, without relying on pre-built functionality within game engines, in order to make their games more dynamic. For students to assess their existing analytical, mechanical and physical skills and build up the skills necessary for successful completion of this course (BSc (Hons) Computer Gaming Technology). This module justifies the practical physics techniques that are required to examine, distinguish, and analyse realistic challenges in game development. The module will be assessed by two elements, Assignment and Final Exam.

6b. Outline Content

-Transformation and Unit Conversion
- Motion in One Dimension, 2D and 3D
- Newton’s Laws
- Work and Kinetic Energy, Potential Energy and the conservation Law
- Momentum and impulse
- Modelling Collisions and Collision with stationary objects
- Rotational Motion

6c. Key Texts/Literature

The reading list to support this module is available at: http://readinglists.anglia.ac.uk/modules/mod004973

6d. Specialist Learning Resources
Students will have access to a specialist game development lab, with the latest industry standard game development tools such as the Unreal Engine, Cry Engine, Unity 3D, 3D Studio Max, Maya, C# programming tools. Access to the internet, library and Anglia Ruskin University VLE are provided

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Identify and illustrate physics discipline in game environment and game understanding design.
2	Knowledge and Understanding	Understand and formulate the practical physics theory and its connection to game programming in real 3D problems.
3	Intellectual, practical, affective and transferrable skills	Implement and analyse an identified simulation within a game engine and make simulated game worlds appear more natural
4	Intellectual, practical, affective and transferrable skills	Recognize and demonstrate physics techniques that can be utilized to solve a variety of practical game development problems

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2017/8	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	12	1,2	12 x 1hr Lecture for weeks 1-12 (Each week for 12 weeks, a lecture or tutorial will be provided for 1 hr)
Other teacher managed learning	24	3,4	1hr Workshops will be provided each week for 12 weeks, to offer support for the topics being covered 1hr x 12 weeks - practical supervised
Student managed learning	114	1-4	Further reading, practices, self-assessments and exercises, 9.5 hours each week for 12 weeks.
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Examination Cambridge	1-4	50 (%)	Fine Grade	30 (%)
Exam 1 hour					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Coursework	1-4	50 (%)	Fine Grade	30 (%)
Assignment 4000 word equivalent- writing a programme in c# implementing physics principles					

In order to pass this module, students are required to achieve an overall mark of 40%.
In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment of as specified above
(b) pass any pass/fail elements