

Module 32 Game Development

Module title	Games Development
Module NFQ level (only if an NFQ level can be demonstrated)	8
Module number/reference	30
Parent programme(s)	Bachelor of Science (Honours) in Computing Science
Stage of parent programme	Award stage
Semester (semester1/semester2 if applicable)	Semester 2
Module credit units (FET/HET/ECTS)	ECTS
Module credit number of units	5
List the teaching and learning modes	Direct, Blended
Entry requirements (statement of knowledge, skill and competence)	Learners must have achieved programme entry requirements.
Pre-requisite module titles	BSCH-CP, BSCH-OOP, BSCH-CD
Co-requisite module titles	None
Is this a capstone module? (Yes or No)	No
Specification of the qualifications (academic, pedagogical and professional/occupational) and experience required of staff (staff includes workplace personnel who are responsible for learners such as apprentices, trainees and learners in clinical placements)	Qualified to as least a Bachelor of Science (Honours) level in Computer Science or equivalent and with a Certificate in Training and Education (30 ECTS at level 9 on the NFQ) or equivalent.
Maximum number of learners per centre (or instance of the module)	60
Duration of the module	One Academic Semester, 12 weeks teaching
Average (over the duration of the module) of the contact hours per week	3
Module-specific physical resources and support required per centre (or instance of the module)	One class room with capacity for 60 learners along with one computer lab with capacity for 25 learners for each group of 25 learners

Analysis of required learning effort		
	Minimum ratio teacher / learner	Hours
Effort while in contact with staff		
Classroom and demonstrations	1:60	18
Monitoring and small-group teaching	1:25	18
Other (specify)		
Independent Learning		
Directed e-learning		
Independent Learning		44
Other hours (worksheets and assignments)		45
Work-based learning – learning effort		
Total Effort		125

Allocation of marks (within the module)					
	Continuous assessment	Supervised project	Proctored practical examination	Proctored written examination	Total
Percentage contribution	60%	40%			100%

Module aims and objectives

This module focuses on the design and development of digital games using a standard games development environment. The module introduces the learner to the issues and methodologies behind the rules and play of games. It introduces the fundamental ideas behind the design of electronic. Learners are introduced to how games function to construct experiences using rule design, play mechanics, game balancing, and the integration of visual, audio and textual elements into the game. They are also introduced to the iterative nature of the design methodology, games documentation and play testing.

The module has a strong practical element focussed on developing skills in game development. The learner also covers the core elements of game design and engagement with the user.

Minimum intended module learning outcomes

On successful completion of this module, the learner will be able to:

1. Distinguish the atomic parts and play mechanics of a game
2. Justify different approaches to Games Design
3. Explain phases in game development (from idea to product)
4. Discuss level design and engagement
5. Develop a small sized game to a usable level

6. Define the structure of a games engine using a design pattern

Rationale for inclusion of the module in the programme and its contribution to the overall MIPLOs

Games Development is a growing sector generating over \$109 billion globally per year. This module allows the Learners to apply their knowledge of programming and systems design to the Games Development, through the development of game based projects using industry standard development tools.

Appendix 1 of the programme document maps MIPLOs to the modules through which they are delivered.

Information provided to learners about the module

Learners receive a programme handbook to include module descriptor, module learning outcomes (MIMLO), class plan, assignment briefs, assessment strategy, and reading materials.

Module content, organisation and structure

Play Mechanics

- What are the rules and how are they structured?
- Creating a balance of obstacles/aids, penalties/rewards
- Discrete/continuous input
- Deterministic/random outcome
- Information flow

Game Theory

- Two player games and strategies
- Payoff matrices

Approaches to Games Design

- Bottom-up versus Top-down design
- Design for the moment
- Building gameplay from within a story and setting
- Game genre and platform affects

Generating Ideas

- Brainstorming
- Identifying systems
- Turning ideas into game concepts
- Evaluating concepts
- Design documents
- Prototyping

Introduction to Game Programming Concepts

- The game loop
- Handling user input
- Collision detection
- Events and triggers
- Models and animation
- Non-player characters
- Sound and effects
- Level design
- Engaging the user
- Emergent gameplay

Structure of the Games Engine

- File structure
- Layers
- Particle effects
- Lighting

Programming for the Games Engine

- Scripting
- Events and triggers
- Creating new entities and properties
- Creating methods and events
- Deployment
- Level design

Module teaching and learning (including formative assessment) strategy

The module is delivered through a combination of lectures, tutorials and practical lab programming sessions. The learners complete a series of worksheets throughout the module which build on the learning in lectures. The emphasis is on developing practical programming skills based on sound theoretical knowledge.

Assessment consists of two elements of continuous assignment. Each week learners are required to complete a series of programming and design tasks that relate to the material covered in lectures, these formative tasks contribute to the later summative project. The practical lab sessions are used to enforce concepts covered in the lectures and the worksheets are used to ensure that learners are keeping up with the material as it is delivered. Lab sessions are also used to deal with issues emerging from the worksheets.

Timetabling, learner effort and credit

The module is timetabled as one 1.5-hour lecture and one 1.5-hour lab per week.

The number of 5 ECTS credits assigned to this module is our assessment of the amount of learner effort required. Continuous assessment spreads the learner effort to focus on small steps before integrating all steps into the overall process of games development.

There are 36 contact hours made up of 12 lectures delivered over 12 weeks with classes taking place in a classroom. There are also 12 lab sessions delivered over 12 weeks taking place in a fully equipped computer lab. The learner will need 45 hours of independent effort to further develop the skills and knowledge gained through the contact hours. An additional 44 hours are set aside for learners to work on worksheets and assignments that must be completed for the module.

The team believes that 125 hours of learner effort are required by learners to achieve the MIMLOs and justify the award of 5 ECTS credits at this stage of the programme.

Work-based learning and practice-placement

There is no work based learning or practice placement involved in the module.

E-learning

The college VLE is used to disseminate notes, advice, and online resources to support the learners. The learners are also given access to Lynda.com as a resource for reference.

Module physical resource requirements

Requirements are for a classroom for 60 learners equipped with a projector, and a 25 seater computer lab for practical sessions with access to Unity 3D (current version at time of scheduling).

Reading lists and other information resources

Recommended Text

Hocking, J. (2018) *Unity in Action: Multiplatform Game Development in C# with Unity 5*. Manning Publications

Rabin, S. (2010) *Introduction to Game Development*. Boston: Cengage Learning.

Secondary Reading:

Creighton, R. H. (2010) *Unity 3D Game Development by Example*. Birmingham: Packt Publishing.

Brathwaite, B. and Schreiber, I. (2009) *Challenges for Game Designers*. Boston: Cengage Learning.

<https://gamedesignconcepts.wordpress.com/>²

Specifications for module staffing requirements

For each instance of the module, one lecturer qualified to at least Bachelor of Science (Honours) in Computer Science or equivalent, and with a Certificate in Training and Education (30 ECTS at level 9 on the NFQ) or equivalent.. Industry experience would be a benefit but is not a requirement.

Learners also benefit from the support of the programme director, programme administrator, learner representative and the Student Union and Counselling Service.

Module Assessment Strategy

The assignments constitute the overall grade achieved, and are based on each individual learner's work. The continuous assessments provide for ongoing feedback to the learner and relates to the module curriculum.

No.	Description	MIMLOs	Weighting
1	A series of weekly milestones covering the design and development of a game	1-5,7	60%
2	Design, develop, test and debug a game and related documentation	1, 2, 5, 6, 7	40%

All repeat work is capped at 40%.

Sample assessment materials

Note: All assignment briefs are subject to change in order to maintain current content.

² Last accessed 26/07/2018

Project Info

Game Prototype Assignment

Assignment Weighting: 40%

Create a game prototype using Unity 3D

This can be a 2D top down shooter or a 2D side scrolling runner.

Must Include:

- 1 Core Gameplay Mechanic
- Sound (FX/Music)
- Interactive Environment

Option - Must Include at least 2:

- Physics (Rigidbody)
- NPCs
- AI
- Story telling
- Second Core Mechanic

Note: Creation of art assets is not a requirement, but try and implement some simple shapes in interesting ways! There are also free assets you can find and use online.

Submission Format

- A .EXE or web build of the game (Either option must be zipped and tested)
- The Entire Unity Game Project Zipped
- Upload these .ZIP files to Moodle

Learning Outcomes

- Understand phases in game development
- Game system architecture
- Develop a small sized game to a usable level
- Define the structure of a games engine using a design pattern

Continuous Assessment

Assessment Weighting: 60%

Initial Pitch (10%)

- This will be an initial idea for your game
- Based on feedback you will analyse and refine (or redo) your idea ahead of submitting the initial design doc

High Concept Design Document (20%) (10% for first submission, + 10% for report at the end, and updated design doc)

- Summary of Game
 - Description of your game
 - Influences
- Gameplay
 - Core mechanic/s of your game
 - Win/Lose Condition
 - Instructions on how to play
- List of assets that need to be created for project (like a checklist)
- **PART 2, to be submitted with final game:**
- Challenges
 - Did you run into any design challenges?
 - Did you run into any technical challenges?

Playtest Session (10%)

- Held in class Date to Be decided
- Implement feedback

Attendance (10%) - This is a mostly continuous assessment class, so attendance is important

Think about how these concepts will help you create an engaging prototype:

- Handling user input
- User-friendly experience (Pick'up'and'Play)
- Feedback
- Fun factor
- Emergent gameplay
- Engaging the user

Submission Format

- Upload .PDF file to Moodle

Learning Outcomes

- Creation of production plan
- Discuss level design and engagement
- Discuss ludology and emergent behaviour