

2024 / 25

School of Science and Computing

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🌐 [www.wit.ie/schools/science\\_computing](http://www.wit.ie/schools/science_computing)



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## Module Descriptor

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### Game Development in C++ (Computing and Mathematics)

# Game Development in C++ (A12561)

**Short Title:** Game Development in C++  
**Department:** Computing and Mathematics  
**Credits:** 5

**Level:** Advanced

## Description of Module / Aims

This module deepens the students knowledge of game development techniques in C++ and an appropriate game framework and third party libraries to incorporate features such as networking, artificial intelligence, multiplayer modes, and game physics.

## Programmes

			stage/semester/status
GAME-0008	BSc (Hons) in Applied Computing (WD_KACCM_B)		4 / 7 / E
GAME-0008	BSc (Hons) in Applied Computing (WD_KCOMP_B)		4 / 7 / E
GAME-0008	BSc (Hons) in Computer Science (WD_KCMSC_B)		4 / 7 / E

## Pre-Requisite(s)

- Introduction to C++ for Games

## Indicative Content

- Data structures and algorithms: tile sets and maps, decision trees, influence map, dependency graphs, path finding, path following, hierarchical finite state machines, design patterns
- Data-driven game engines: entity systems, component-based design and relevant design patterns
- Memory and resource management: memory allocation and garbage collection; storing, loading and caching strategies
- Networked games: networked game architectures and protocols, threads, critical sections, latency
- Game libraries for AI, networking, physics, and audio

## Learning Outcomes

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

1. Develop a prototype of a non-trivial game containing features such as AI, multiplayer modes, networking, or physics.
2. Design and implement bespoke tools for managing game assets.
3. Evaluate multiple programming paradigms appropriate to the game being developed such Data Driven Development.
4. Create a suitable game framework and integrate additional libraries necessary for physics, networking, AI and sound as required.
5. Evaluate and implement custom memory managers.
6. Evaluate and implement techniques for managing game resources which exceed available memory.

## Learning and Teaching Methods

- Computer-based practicals will be used to demonstrate the application of theory by the lecturer and allow students to gain practical development experience with the direction of the lecturer.
- Cooperative learning/peer tutoring (i.e. Pair-programming for practicals and team-based approaches for some assignments).
- Self-directed learning.

## Learning Modes

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

## Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	20%	2,3
Assignment	20%	3,4
Assignment	60%	1,5,6

## Assessment Criteria

<40%: Inability to design and implement a game. Inability to develop bespoke tools for managing game assets as per Learning Outcome 2. Inability to critically assess techniques for managing game resources.

40%–49%: Ability to design and implement a stand-alone game. Ability to develop bespoke tools for managing game assets as per Learning Outcome 2. Ability to critically assess techniques for managing game resources.

50%–59%: All the above and in addition, correctly choose appropriate data structures, algorithms and patterns.

60%–69%: All of the above, in addition implement all required features consistently well.

70%–100%: All previous to an excellent level. Starts to extend game and framework with features such as resource caching, goal-based behaviour, etc.

## Supplementary Material(s)

- Rollings, A. and D. Morris. *Games Architecture and Design: A New edition*. Boston: New Riders Publishing, 2004.
- "Cocos 2D-x." <http://www.cocos2d-x.org>
- "Gamasutra: The Art and Science of Making Games." <http://www.gamasutra.com/>
- "GameDev.ent." <http://www.gamedev.net/>
- "Microsoft DreamSpark." <https://www.dreamspark.com/default.aspx>

## Requested Resources

- Room Type: Computer Lab