

<b>Module Title:</b>	3D Graphics
<b>Language of Instruction:</b>	English
<b>Credits:</b>	5
<b>NFQ Level:</b>	7
<b>Module Delivered In</b>	<a href="#">1 programme(s)</a>
<b>Teaching &amp; Learning Strategies:</b>	Students will participate in an active and technology-enhanced learning environment that includes interactive lectures as well as collaborative, project-based and problem-based learning activities and tasks that develop the students' foundational and practical knowledge in 3D Graphics for game development. Learning is further augmented with feedback from formative and summative assessments.
<b>Module Aim:</b>	Develop the students' knowledge of how contemporary game engines are architected in order to competently use them to build sophisticated and creative games. Develop the students' knowledge of the 3D graphics rendering pipeline particularly in terms of programmability and the associated practical techniques and applications. Develop the students' practical knowledge to create realistic interactive real-time game objects using 3D game engines.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Analyse game engine architecture, main subsystems, design patterns and scripting.
LO2	Explain, implement and relate advanced real-time 3D graphics techniques relevant to game development.
LO3	Develop advanced real-time interactive 3D games using a contemporary game engine individually or in a team setting.
<b>Pre-requisite learning</b>	
<b>Module Recommendations</b> <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
<b>Incompatible Modules</b> <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b> <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

**Module Content & Assessment**

**Indicative Content**

**Game engine architecture**

Architecting game engines, characteristics, engine subsystems and components, rendering engine, evolution of game engines, design patterns, external tools, content pipeline.

**Advanced rendering techniques**

Rendering pipeline, vertex processing, rasterization, fragment processing, z-buffering, blending, shader programming, shader graphs, lighting, Phong model, texturing, normal mapping, displacement mapping.

**Building a 3D Game using a game engine**

Scripting, game object model, component model, entity component system, game objects, assets, components, scenes, cameras, UI, audio, physics, particle systems, animation, terrain editor, layers and tags, event system, build, version control, profiling and debugging, testing, project management, collaboration, documentation.

Assessment Breakdown	%
Continuous Assessment	30.00%
Project	40.00%
Practical	30.00%

**Continuous Assessment**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	Written test	1	15.00	Week 7
Examination	Written test	2	15.00	Week 11

**Project**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Team project	2,3	40.00	Week 14

**Practical**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Laboratory Participation, completion of assigned worksheets	1,2,3	30.00	Every Second Week

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	12 Weeks per Stage	3.00
Laboratory	12 Weeks per Stage	3.00
Independent Learning Time	15 Weeks per Stage	1.33
Independent Learning Time	15 Weeks per Stage	2.20
Total Hours		125.00

**Module Delivered In**

Programme Code	Programme	Semester	Delivery
CW_KCCGD_B	<a href="#">Bachelor of Science (Honours) in Computer Games Development</a>	5	Mandatory