SE TU Ollscoil Teicneolaíochta an Oirdheiscirt

South East Technological University

Module Descriptor

3D Lighting and Rendering (Computing and Mathematics)

3D Lighting and Rendering (A11565)

Short Title: 3D Lighting and Rendering
Department: Computing and Mathematics
Credits: 5   **Level:** Advanced

Description of Module / Aims

This module looks at the lighting and rendering components of the 3D digital animation pipeline. The module will encompass materials editing, lighting and shadows, and rendering using an industry-standard rendering engine. Students will have the opportunity to explore advanced techniques and effects that may be used to light and render complex 3D scenes and, using pre-existing scene assets, and to produce a photo-realistic and production-quality rendered scene.

Programmes

		stage/semester/status
COMP-0631	BSc (Hons) in Creative Computing (WD_KCRCO_B)	4 / 7 / E
COMP-0631	BSc (Hons) in Multimedia Applications Development (WD_KMULM_B)	4 / 1 / E

Indicative Content

- Principles of light and colour
- Materials and Maps
- 3D lighting including standard, photometric, and HDRI lighting
- Shadows
- Rendering including indirect and global illumination
- Effects including lens and camera shaders

Learning Outcomes

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

1. Appraise approaches to managing and creating materials used in 3D rendering.
2. Compare standard, photometric and HDRI lighting assemblies.
3. Evaluate, in terms of optimisation, techniques used to render shadows in 3D animation.
4. Create camera and lens effects in a pre-existing 3D scene.
5. Integrate lighting and rendering techniques to manage the production of a short animated scene.

Learning and Teaching Methods

- Interactive and open-forum lectures.
- Class discussions and presentations.
- Problem-based learning activities.
- Self-directed learning.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	12	
Practical	36	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	40%	1,2,3
Project	60%	3,4,5

Assessment Criteria

<40%: Unable to interpret and describe key concepts of the specific knowledge domain(s).

40%–49%: Be able to interpret and describe key concepts of the specific knowledge domain(s).

50%–59%: Ability to discuss key concepts of the specific knowledge domain and ability to discover and integrate related knowledge in other knowledge domains.

60%–69%: Be able to solve problems within the specific knowledge domain(s) by experimenting with the appropriate skills and tools.

70%–100%: All the above to an excellent level. Be able to analyse and design solutions to a high standard for a range of both complex and unforeseen problems through the use and modification of appropriate skills and tools.

Essential Material(s)

- Lanier, J. *Advanced Maya Texturing and Lighting.* New York: Sybex, 2015.

Supplementary Material(s)

- Palamar, T. *Mastering Autodesk Maya.* New York: Sybex, 2016.

Requested Resources

- Computer Lab: BYOD Lab