Module Title:	Advanced Graphics, CAD & BIM
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	No Programmes

Teaching & Learning Strategies:	• Studio-based project & problem-based learning to develop the learners' problem- solving methodology to an advanced level, in an architectural technology context, with one-to-one reviews/tutorials and group/class 'crits' to provide student feedback • Group/team work utilised as appropriate • Lecture format utilised to provide theoretical instruction in CAD/BIM/3DS/Photoshop software tools.

Module Aim:	• To provide a fusion of best practice in Building Information Modelling and Visualization, by using the Design Thesis Studio unit / module as a vehicle to establish best practice industrial standards. • Explore sustainable design with Revit Architecture. • To learn advanced modelling and presentation techniques. • Introduce project collaboration using BIM.

Learning Outcomes

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

LO1	Use advanced BIM and sustainable design strategies to produce and evaluate building of medium complexity, focusing on the highest professional standards.
LO2	Create complete sets of professional-quality construction documents and create documentation to demonstrate BREEAM and LEED compliance.
LO3	Introduce mechanical, electrical and plumbing (MEP) systems into BIM models and evaluate the sequence in which MEP services are used.
LO4	Setup and manage a BIM collaborative environment, and run clash detection on their models.
LO5	Create conceptual and detailed energy analysis of their models using Green Building Studio and use conceptual mass studies to explore the building shape and perform feasibility studies.
LO6	Evaluate onsite energy systems in BIM.
LO7	Use 3ds Max design using mental ray to achieve the most realistic renderings with global illumination and final gathering.
LO8	Create composite photo realistic image elements in Photoshop using pre-rendered images from BIM and 3ds Max Design.
LO9	Advanced creation and management of drafting views ensuring that they are tied parametrically to sheets and all references are dynamic and coordinated. Advanced 3D details fully annotated, using parts and assemblies.

Pre-requisite learning

Module Recommendations
This is prior learning (or a practical skill) that is recommended before enrolment in this module.

5296	GRAP H3512	Graphics, CAD & BIM II

Incompatible Modules
These are modules which have learning outcomes that are too similar to the learning outcomes of this module.

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

Requirements
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.

No requirements listed

Module Content & Assessment

Indicative Content

Advanced Customisation of Buildings, Families and Project Settings
(a) Advanced modelling techniques for walls, stacked walls, curtain walls, ceilings, floor, slabs, roofs, columns, beams, truss, bracing, foundation, piling, stairs, ramps and railings. (b) Creating advanced family types in the project environment and family editor.

Advanced Detailing Techniques, Collaboration and Sustainable Design.
(a) Creating 3D axonometric details in 3D view and adding annotation to the 3D detail. (b) Exporting and importing details and views from Revit projects. (c) Incorporating a sustainable design approach from the beginning. (d) Creating solar studies and create animated sun studies. (e) Leverage schedules to track sustainable design strategies. (f) Develop your design using work sharing, workflows and collaboration. (g) Understand the principles of groups and links. (h) Collaborating, tracking changes and coordinating processes.

Create Professional-quality Construction Documentation.
(a) Using callouts create views, sheets, annotation, tag, schedules, legends, 3D sections, elevations, sections, details and keynotes. (b) Rendering, real-world surfaces with architectural materials. Creating and editing materials from digital images using real world scale.

Evaluate Onsite Energy Systems and Green Building Studio.
(a) Solar photovoltaics, energy storage, wind turbines, building and site hydrology. (b) Create conceptual and detailed energy analysis of your BIM models.

Mechanical, Electrical and Plumbing (MEP)
Project collaboration, schedules, legends, HVAC heating and cooling, ductwork, piping, lighting, power and communications, mechanical systems, electrical systems and circuits, plumbing systems and fire protection.

3Ds Max design
(a) Assign images as environmental maps. Create and edit materials and maps using material editor. (b) Understand a logical approach for calculating mental ray rendering. (c) Understand Global Illumination, Indirect Illumination and Final Gather. (d) Creating daylight systems, setting the material reflectivity and understanding photometric lights. (d) Understanding and Creating Animations (e) Understanding the World of Video Time, adding and adjusting cameras. Understanding and editing keyframes. Creating walkthroughs, understanding animation file output options.

Photoshop Essentials
(a) Pixels, Bitmaps, Grayscale to RGB versus CMYK. Setup raster printer in AutoCAD matching scale and resolution. (b) Natural selection, transformation, distortion, hiding and showing. (c) Getting into Perspective (d)Establishing the horizon, introducing vanishing points filters; two point and three point perspective. Move, copy and clone in perspective. (e) Light and Shade (f) Shadows on the ground and walls, shading using dodge and burn (g) The Third Dimension (h) Adding depth to flat artwork, matching existing perspective and using displacement maps. (i) Plans and Elevations (j) Exporting images from BIM, converting vector to raster and creating depth with shadows. Setting background and swatches, adding noise for textures. Reflecting clouds and environment in glass and extracting realistic figures.

Assessment Breakdown	%
Project	100.00%

No Continuous Assessment

Project

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Conservation Project	1,2,3,4,5,6,7,8,9	45.00	Sem 1 End
Project	Thesis Project	1,2,3,4,5,6,7,8,9	55.00	Sem 2 End

No Practical

No End of Module Formal Examination

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

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Project	30 Weeks per Stage	2.00
Project	30 Weeks per Stage	2.00
Independent Learning	30 Weeks per Stage	6.00
	Total Hours	300.00