MODULE TITLE:	**Digital Scripting**
MODULE CODE:	IMDCGD212
LEVEL:	5
CREDITS:	20
TOTAL STUDY HOURS:	200
STUDY HOURS BREAKDOWN	36 hours lectures and workshops 12 hours individual and group tutorials 152 hours independent learning
PRE-REQUISITES:	IMDCGD108 Introduction to Digital Production Techniques: Scripting
EXCLUDED COMBINATIONS:	None
MODULE LEADER:	Steve Harris
MODULE CONTRIBUTOR(S):	-

RATIONALE

It is crucial that students undertaking the course have sufficient understanding of the technical aspects of games development so that they are able to produce their own prototypes to explore mechanics or fully fledged games as an independent developer.

The module builds upon the groundwork built up in IMDCGD108 Introduction to Digital Production Techniques: Scripting, allowing students to further expand upon their understanding of scripting by rapidly iterating projects individually and as part of small groups.

AIMS

1. Expand students understanding of scripting development techniques.
2. Introduce students to rapid iterative prototyping with 2D and 3D game engines.

LEARNING OUTCOMES

On successful completion of this module, students should be able to:

1. Demonstrate a critical understanding of the key concepts in 2D and 3D games development.
2. The skills required to design, code and debug artefacts created via 2D and 3D development tools.
3. Demonstrate an ability to rapidly iterate game designs produced to a specified brief.

INDICATIVE CONTENT

2D and 3D game development, Unreal Engine 4 (UE4) and similar game engines, iterative development, rapid production techniques, game prototyping, implementing game mechanics, programming styles, scripting languages, visual scripting.

LEARNING AND TEACHING STRATEGIES

The module will be taught in a series of lectures and workshop sessions, using a combination of presentations/demonstrations, online materials and small group and / or individual tutorial

discussion. Key concepts will be presented to the group and illustrated through multimedia demonstrations.

EMPLOYABILITY SKILLS

On successful completion of this module, a student will be able to demonstrate achievement of the following Employability Skills:

C1	Reading, selecting, analyzing and synthesizing information from a range of sources.
C2	Producing different types of document.
IT1	Preparing information.
IT2	Processing and presenting information.
PS1	Develop a strategy for using skills in problem-solving, for a short term routine problem or a longer term extended problem.

ASSESSMENT

Formative feedback will be provided during regularly timetabled tutorial sessions and through practical workshops. There are four summative assessments for this module:

ASSES	Component	Form of assessment	Weighting (%)	Learning Outcomes assessed
1	**Assessment 1a: The Map**	A plan of a 2D platform game	20%	3
	Assessment 1b: The Completed 2D Game	The completed 2D game	30%	1, 2
2	**Assessment 2a: Prototypes**	5 prototypes, demonstrating 5 individual blueprint game mechanics you will use in the final 3D game.	10%	3
	Assessment 2b: The Completed 3D Game	The completed 3D game.	40%	1, 2

ASSESSMENT 1

For assessment 1 you will make a 2D side scrolling platform game in UE4. There are two parts to assessment 1. Part 1a is a planned map of the platform game, and part 1b will be the game itself.

Component Number	Form of assessment	Weighting (%)	Learning Outcomes assessed
Assessment 1a: The Map	A plan of the 2D platform game	20%	3
Assessment 1b: The Completed 2D Game	The completed 2D game	30%	1, 2
	Total for Assessment 1		**50%**

ASSESSMENT 1a: THE MAP 20%

SUBMISSION DATE: Friday, October 28th, 2016, 12 noon

For Assessment 1a: The Map, you will create a detailed plan for the entire level on paper (or in digital form but must NOT be created in UE4) which specifies exactly, the follow requirements:

1. Exact position of all assets, for example: floors, platforms, ladders, traps, enemies, collectables.....
2. Exact scale and orientation of all assets, for example: floors, platforms, ladders, traps, enemies, collectables.....
3. Direction and distance of movement of any animated assets, eg platforms, obstacles, enemies, collectables.....
4. An indication of the optimal path through the level.
5. Relationship between objects such as key/doors, traps/switches, triggers/animations.
6. A detailed key which clearly identifies ALL the assets in the map, as well as keyboard controls for the game.

For examples and inspiration of 2D platform plans try here https://uk.pinterest.com/harris7473/2d-platformer-plans/
A one page description of the game which clearly states the intended emotional profile which the game aims to achieve and the game objectives must also be provided.

All digital work must be submitted on a CD/DVD. You MUST check the contents of the CD/DVD on a computer other than the one which you used to burn the disk. This is to ensure that the contents of the disk have been written correctly and that the CD/DVD is not blank. Any blank disks will be treated as a 'non submission', there will be no opportunity to resubmit the disk after the hand-in if it is blank.

PLEASE CHECK YOUR DVD BEFORE SUBMITTING IT.

To summarise: You will submit:

1. A paper or digital map (created in something other than UE 4) detailing all aspects of the intended game, as stated above.
2. A one page description which identifies the emotional profile you are aiming to achieve in players, and the objectives in the game.
3. If handing the work in digital form, you must use (and check) a CD/DVD.

ASSESSMENT 1a: THE MAP – CRITERIA

Student Name:		
3rd	**1st Marker**	**2nd Marker**
A map, and 1 page description, outlining the layout of the level is submitted, but lacks details on the position, scale, orientation and animation details of assets.		
No relationship between linked assets (eg, keys/doors) is provided.		
A path through the level is indicated on the map.		
A basic, yet incomplete key for the map is provided.		
2:2		
The map provides inconsistent details on the position, scale, orientation and animation details of assets.		
Some relationships between linked assets (eg keys/doors) is provided.		
Some aspects of the path through the map are optimal.		
Most aspects of the key are complete.		
2:1		
The map provides consistent details on the position, scale, orientation and animation details of assets.		
The 1 page description clearly outlines the desired emotional profile.		
All relationship between linked assets (eg, keys/doors) are clearly indicated.		
Most aspects of the path through the map are optimal.		
A complete and detailed key for the map is provided.		
1st ***As for 2:1, but including***		
A professionally presented map and key are provided.		
A highly detailed map, key and 1 page description, are presented which allows the viewer to understand all aspects of the level.		
The map and key would allow a viewer to implement this map in a game engine without the need to seek clarification on any aspect.		
Grade		
Agreed Grade		

ASSESSMENT 1b: THE COMPLETED 2D GAME 30%

SUBMISSION DATE: Friday December 9th, 2016, 12 noon

Assessment 1 will also include a completed 2D platform game, constructed in UE4. This will be an implementation of the initial design map you submitted in assessment 1a.
The focus of this assessment will be the technical aspects of the game, focussing on the Blueprint scripting and technical implementation of the required assets.

You are not expected to generate the assets for this game yourself. The assessment criteria will not assess you on the quality of the artwork. You may use any free 2D assets you wish, but must provide full and accurate links to their source in a MS Word document. For example, opengameart.org provides a good resource for free sprite sheets

http://opengameart.org/content/platform-tileset-nature
http://opengameart.org/content/platformer-art-deluxe

You need to submit a compiled version of the game for MS Windows platform and a copy of the UE 4 project. UE 4 projects can be of a significant size, and if your project will not fit onto a DVD then you must use a service such as Dropbox, Skydrive or Google Drive and submit a link to a compressed archive of the project in a text file. Please make sure there is no password protection the file or folder. If you are not familiar with how to do this please ask the module tutor, and do so several days in advance of the hand-in date.

PLEASE CHECK YOUR DVD BEFORE SUBMITTING IT.

To summarise,: On a CD or DVD you will submit:

1. A compiled version of the game which can be executed on the Microsoft Windows platform.
2. A copy of the full UE4 Project. (if the project is too large to fit on a DVD, then you must submit a URL to a cloud storage for the project. Please make sure there is no password protection the file or folder).
3. A Microsoft Word document which identifies the source of the game assets.

ASSESSMENT 1b: THE COMPLETED 2D GAME – CRITERIA

Student Name:		
3rd	**1st Marker**	**2nd Marker**
Very basic gameplay mechanics are implemented within the game.		
An attempt has been made to document only a few aspects of the code.		
One or more serious bugs are present which have a negative impact on the gameplay.		
Some assets are clearly referenced.		
2:2		
Some evidence that more complex gameplay mechanics have been attempted within the game.		
Inconsistent documentation of the code, with evidence of an attempt to explain how the code works.		
Evidence of some bugs which have an overall negative impact on the gameplay.		
Most assets are clearly referenced.		

2:1		
Complex gameplay mechanics have been implemented well within the game.		
Consistent documentation of the code, with a good level of detail in the explanations of how the code works.		
Evidence of only minor bugs which do not have a negative impact on the gameplay.		
All assets are clearly referenced.		
1st ***As for 2:1, but including***		
Complex gameplay mechanics are implemented and commented in detail throughout the game.		
An overall high quality game.		
Grade		
Agreed Grade		

ASSESSMENT 2

Assessment 2 will be in the form of a 3D game. You will be required to prototype key game mechanics first so that you can discover if and how those mechanics can be implemented.

You may be choose the type of 3D you want to build for this assignment. The game must be based on Unreal Engine 4. You can choose to build your game using Unreal Tournament 4, as this game is built using Unreal Engine 4, and uses the same blueprint visual scripting tools, You MUST have your game approved by the module leader and clarify if you will be using Unreal Engine 4 or Unreal Tournament 4.

Component Number	Form of assessment	Weighting (%)	Learning Outcomes assessed
Assessment 2a: Prototypes	5 prototypes, demonstrating 5 individual blueprint game mechanics you will use in the final 3D game.	10%	3
Assessment 2b: The Completed 3D Game	The completed 3D game.	40%	1, 2
	Total for Assessment 1		**50%**

ASSESSMENT 2a: PROTOTYPES 10%

SUBMISSION DATE: Friday 3rd March 2017, 12 noon

For this assessment you are tasked with identifying the top 5 most complex aspects of your game and to develop a working prototype for each. You should do this before you start development of the actual game. *The aim is to identify if those mechanics can actually be implemented with Unreal Tournament 4 within a reasonable time scale.* These prototypes should not include any final artwork and should be implemented within a 'grey box' test level. All the prototypes should be implemented within one Unreal project (Unreal Engine 4 or Unreal Tournament 4). The aim is not to start to build the game, but to learn how to implement the required game mechanics within a separate project, and to discover if the game mechanics are actually possible within the current timescales. The

prototypes can be imported into a clean project at a later date. It is recommended that you do not proceed into the development phase until you have completed the prototypes. You are of course welcome to (in fact it is recommended to) prototype other mechanics of your game at this stage, however, only 5 prototyped game mechanics are required for this assessment.
During this process, if it is discovered that one of the mechanics is too complex or too time consuming to implement then you should either simplify the mechanic or eliminate it from the design. The module tutor/s will be able to advise you on such decisions if you keep them informed of your progress each week. The key aspect here is to get to that decision point as soon as possible and proceed into the development phase knowing that all those key mechanics can be implemented. This may sound like a minor point but is *very* important in being able to deliver a project on time and not getting caught out by technical or time limitations.
The code in the prototypes must be fully commented to demonstrate that you understand the logical steps in all aspects of the blueprint. General overview notes or other points of interest should be included as comment blocks within the blueprint.

PLEASE CHECK YOUR DVD BEFORE SUBMITTING IT.

To summarise: On a CD or DVD you will submit:

1. 5 fully commented prototypes of 5 key gameplay mechanics. Submitted as one Unreal 4 project (Unreal engine 4 or Unreal Tournament 4).

ASSESSMENT 2A: PROTOTYPES - CRITERIA

Student Name:		
3rd	**1st Marker**	**2nd Marker**
Attempts are made to identify the 5 most complex game mechanics to prototype.		
Basic implementations are provided for the prototypes.		
Some attempt to comment some aspects of the blueprint.		
2:2		
Some ability to implement complex game mechanics.		
Evidence of limited self directed learning within the game code.		
Comments demonstrate inconsistent level of understanding of the code.		
2:1		
Good ability to implement complex game mechanics.		
Evidence of significant self directed learning within the code.		
Comments demonstrate a good level of understanding of the code.		
1st ***As for 2:1, but including***		
Highly complex blueprint code implements key game mechanics.		
Comments demonstrate a high level of understanding of the code.		
Grade		
Agreed Grade		

ASSESSMENT 2b: THE COMPLETED 3D GAME 40%

SUBMISSION DATE: Friday 5th May 2017, 12 noon

Once you have prototyped the key mechanics and have decided which mechanics can be implemented within the available time, it is now time to create the final game.

Remember that the focus is on the scripting (blueprint) aspects of the game, so it is recommended you consider how you can implement fairly complex mechanics. While adding lots of simple mechanics may make the game 'look' more complex, this will not necessarily demonstrate complex scripting principles. One very good approach (and which is highly recommended) is to use only a few mechanics and mix/modify the way in which they interact. For example, if you have the code to implement a ladder and a separate moving platform. You could combine these to make a ladder which is located on a moving platform and which moves with the platform. There are good opportunities to be creative in the way in which you combine just a few simple core mechanics.

You are not expected to generate the assets for this game yourself. The assessment criteria will not assess you on the quality of the artwork. You may use any free 3D assets you wish, but you must provide full and accurate links to their source in a MS Word document. You may wish to use the free assets available through the Epic marketplace. The free Infinity Blade asset packs may be of particular interest. You can access these through the Epic Launcher, in the Unreal Engine tab and then the Marketplace tab. Then type 'infinity' into the search box to find them.

You may link the work carried out in this module to other modules this year. For example you could use the 3D assets you build in the 3D Modelling for Games module to build the level for the Level Design module. Then use this module to add interactions into that level as well. There will be no overlap or duplication of work in this approach. This is entirely optional, but could provide you with the opportunity to focus on building one high quality 3D level using knowledge from 3 different modules.

Whichever assets you do use, they will not be considered as part of the assessment for this module.

You need to submit a compiled version of the game for MS Windows platform and a copy of the Unreal project. Unreal projects can be of a significant size, and if your project will not fit onto a DVD then you must use a service such as Dropbox, Skydrive or Google Drive and submit a link to a compressed archive of the project in a text file. Please make sure there is no password protection the file or folder. If you are not familiar with how to do this please ask the module tutor, and do so several days in advance of the hand-in date.

PLEASE CHECK YOUR DVD BEFORE SUBMITTING IT.

To summarise,: On a CD or DVD you will submit:

4. A compiled version of the game which can be executed on the Microsoft Windows platform.
5. A copy of the full Unreal Project. (if the project is too large to fit on a DVD, then you must submit a URL to a cloud storage for the project. Please make sure there is no password protection the file or folder).
6. A Microsoft Word document which identifies the source of the game assets.

ASSESSMENT 2b: THE COMPLETED 3D GAME – CRITERIA

Student Name:		
3rd	**1st Marker**	**2nd Marker**
Very basic gameplay mechanics are implemented within the game.		
An attempt has been made to document only a few aspects of the code.		
One or more serious bugs are present which have a negative impact on the gameplay.		
Some assets are clearly referenced.		
2:2		
Some evidence that more complex gameplay mechanics have been attempted within the game.		
Inconsistent documentation of the code, with evidence of an attempt to explain how the code works.		
Evidence of some bugs which have an overall negative impact on the gameplay.		
Most assets are clearly referenced.		
2:1		
Complex gameplay mechanics have been implemented well within the game.		
Consistent documentation of the code, with a good level of detail in the explanations of how the code works.		
Evidence of only minor bugs which do not have a negative impact on the gameplay.		
All assets are clearly referenced.		
1st ***As for 2:1, but including***		
Complex gameplay mechanics are implemented and commented in detail throughout the game.		
An overall high quality game.		
Grade		
Agreed Grade		

INDICATIVE READING

Recommended

Cookson, DowlingSoka, Crumpler & Johnson. Unreal Engine 4 Game Development in 24 Hours, Sams Teach Yourself. ISBN-10: 0672337622. ISBN-13: 978-0672337628

Other

Carnell. 2016. Unreal Engine 4.X By Example. Packt Publishing. Packt Publishing. ISBN-10: 1785885537, ISBN-13: 978-1785885532

Dawson. 2014. Beginning C++ Through Game Programming. CENGAGE. ISBN-10: 1305109910. ISBN-13: 978-1305109919

Lee. 2016. Learning Unreal Engine Game Development. Packt Publishing. ISBN-10: 1784398152, ISBN-13: 978-1784398156

Misra. 2015. Learning Unreal Engine Android Game Development. Packt Publishing. ISBN-10: 178439436X, ISBN-13: 978-1784394363

Newton, Feng. 2016. Unreal Engine 4 AI Programming Essentials. Packt Publishing. ISBN-10: 1784393126. ISBN-13: 978-1784393120

Satheesh. 2016. Unreal Engine 4 Game Development Essentials. Packt Publishing. ISBN-10: 1784391964, ISBN-13: 978-1784391966

Sewwll. 2015. Blueprints Visual Scripting for Unreal Engine. Packt Publishing. ISBN-10: 1785286013, ISBN-13: 978-1785286018

Sherif. 2015. Learning C++ by Creating Games with UE4. Packt Publishing. ISBN-10: 1784396575, ISBN-13: 978-1784396572

Sherif, Whittle. 2016. Unreal Engine 4 Scripting with C++ Cookbook. Packt Publishing. ISBN-10: 1785885545, ISBN-13: 978-1785885549

UE4: 16 Principles - How to Start Learning Unreal Engine 4
http://www.worldofleveldesign.com/categories/ue4/ue4-how-to-learn-unreal-engine4.php

HOW THE MODULE IS ORGANISED

The module will be delivered through a series of lectures and practical's which will cover key concepts and practical techniques. Students will then apply these concepts and techniques to their own game and develop this during the practical sessions. Tutorial session will also be available to students.

Details of the weekly schedule of topics will be made available on LEARN on a weekly basis.