**Faculty of Computing, Engineering & Media (CEM)** **Coursework Brief 2023/2024**

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| **Module Name:** | | Game Platforms | | | | | | | |
| **Module Code:** | | IMAT3002 | | | | | | | |
| **Title of the Assessment:** | | Develop a Cross-Platform VR Game Using the Unity3D Engine | | | | | | | |
| **This coursework item is:** ***(delete as appropriate)*** | | | | **Summative** | | |  | | |
| **This summative coursework will be marked anonymously: *(delete as appropriate)*** | | | | | |  | | | No |
| 1. Demonstrate a systematic understanding of the fundamentals for crossplatform development, more specifically, by being able to leverage unique design considerations and decide what platform is best for a specific genre, or type of game. (Cross-Platform Project & Report) 2. Critically evaluate and select appropriate programming methods when developing for cross-platform applications, namely developing for platforms that have memory considerations and knowing what these will be ahead of time. (Cross-Platform Project & Report) | | | | | | | | | |
| **This coursework is**: | | | **Individual** | | | | |  | |
| **This coursework constitutes** 100% **of the overall module mark.** | | | | | | | | | |
| **Date Set:** | Wednesday 17 Jan 2024  (Week 17) | | | | | | | | |
| **Date & Time**  **Due (the deadline):** | Monday 29 April 2024 (12 noon)  (Week 31) | | | | | | | | |
| **In accordance with the University Assessment and**  **Feedback**  **Policy (**https://www.dmu.ac.uk/about-dmu/qualitymanagement-and-policy/academic-quality/learning-teaching- | | | | | 20 June 2024 | | | | |
| assessment/assessment-feedback-policy.aspx), **your** | | | | |
| **marked coursework and feedback will be available to you on:** | | | | |
| You should normally receive feedback on your coursework by **no later than 15 working days after the formal hand-in date,** provided that you have met the submission deadline.    If for any reason this is not forthcoming by the due date your module leader will let you know why and when it can be expected. The Associate Professor Student Experience (CEMstudentexperience@dmu.ac.uk) should be informed of any issues relating to the return of marked coursework and feedback. | | | | | | | | | |
| **Assignment Submission** | | | | | | | | | |
| **When completed you are required to submit your coursework via:**   1. One text link to your publicly accessible GitHub Repository to the **Unity3D Project source** 2. **A VR/AR/XR Executable** submitted to Learning Zone and 3. A 500-word page **Technical Design Report**, submitted in MS Word or as a PDF on Turnitin via Learning Zone.   *See below for more details*  If you need any support or advice on completing this coursework, please visit the Student Matters tab on the CEM Learning Zone shell. | | | | | | | | | |
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| **Late Submission of Coursework Policy:** | | | | | | | | | |
| Late submissions will be processed in accordance with current University regulations (https://www.dmu.ac.uk/about-dmu/quality-management-and-policy/academicquality/academic-regulations-assessment-boards/academic-regs-assessment-board- | | | | | | | | | |
| homepage.aspx) which state:  “*the time period during which a student may submit a piece of work late without authorisation and have the work capped at 40% [50% at PG level] if passed*  *is* ***14 calendar days****. Work submitted unauthorised more than 14 calendar days after the original submission date will receive a mark of 0%. These regulations apply to a student’s first attempt at coursework. Work submitted late without authorisation which constitutes reassessment of a previously failed piece of coursework will always receive a mark of 0%.”* | | | | | | | | | |
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| **Academic Offences and Bad Academic Practices:** | | | | | | | | | |
| These include plagiarism, cheating, collusion, copying work and reuse of your own work, poor referencing or the passing off of somebody else's ideas as your own. If you are in any doubt about what constitutes an academic offence or bad academic practice, you must check with your tutor. Further information and details of how DSU can support you, if needed, is available at:    http://www.dmu.ac.uk/dmu-students/the-student-gateway/academic-support-office/ | | | | | | | | | |
| academic-offences.aspx and | | | | | | | | | |
| http://www.dmu.ac.uk/dmu-students/the-student-gateway/academic-support-office/bad- | | | | | | | | | |
| academic-practice.aspx | | | | | | | | | |
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| **Tasks to be Undertaken:** | | | | | | | | | |
| 1. Construction of an **Unity3D Engine-based VR Experience** to be developed using the skills and knowledge obtains from the module. 2. Should include at least the six techniques (*see below*) to be incorporated into the design and development of the game. 3. A **Technical Design Report** (TDR) stating the **development** of the game, a discussion of the **techniques**, and **critically** **evaluating** **performance**.   *See below for more details* | | | | | | | | | |
| **Deliverables to be Submitted for Assessment:** | | | | | | | | | |
| 1. One text link to your publicly accessible GitHub Repository to the **Unity3D Engine Project source,** 2. A **Unity3D-based VR Executable Experience** submitted to Learning Zone and 3. A **Technical Design Report** (TDR), submitted in MS Word or as a PDF on Turnitin via Learning Zone.   *See below for more details* | | | | | | | | | |
| **How the Work will be Marked:** | | | | | | | | | |
| Using the outlined matrix and feedback returned electronically. *See below for more details and matrix* | | | | | | | | | |
| **Module leader/tutor name:** | | Aboozar Taherkhani | | | | | | | |
| **Contact details:** | | Aboozar.taherkhani@dmu.ac.uk | | | | | | | |

Should you need any further information or advice please email cemadvicecentre@dmu.ac.uk

Assignment –

Develop a Cross-Platform VR Experience Using the Unity3D Engine

**Your task**

In this course we have learned about the design and implementation of AR/MR/XR games and experiences using C# inside the **Unity3D Game Engine** a Meta Quest 2 Build.

As part of this, we looked at the unique **considerations** and **techniques** for the development of games for Windows under this game engine environment.

You must think about the genre of the experience that you want to implement in Unity3D Engine. There is no assigned theme, and it may utilize any of the base Unity3D game templates, appropriate for VR deployment.

This experience is limited only by your imagination and could be an interior or exterior environmental walkthrough, a fighting game, a training simulation or a metaverse experience.

You must prepare a short narrative for the game (to be discussed in the TDR.

The outline of that narrative is structured around the **techniques** employed in Develop a Cross-Platform VR Experience Using the Unity3D Engine.

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| ***Required Techniques Include:*** |
| ***1. Gaze-based interaction*** |
| ***2. Controller-based interaction*** |
| ***3. UI Interaction*** |
| ***4. Scene Management*** |
| ***5. Character/ Avatar Movement*** |
| ***6. Physics, Lighting and Effects*** |
| ***7. Player Comfort*** |
| ***8. Optimization*** |

*There are eight (8) individual techniques, worth 10 points each for a total of 80 points. You, as the developer should implement these eight techniques as specified and described in the TDR document.*

Your task for this assignment will be a Unity3D Experience that is appropriately designed and implemented for the Meta Quest 2. As part of the submission, you should incorporate the above **techniques**, with an appropriate level of complexity.

**Make sure that your project is Unity3D Engine (See Further Information below).**

The length of the experience is dependent on the experience being developed important; however, you must demonstrate your **experience** and implementation of the above **techniques** through a:

A. **TDR Document** (500 words). Addressing the key themes of your experience and discuss how you developed your work. Include screenshots and discussion of all major Unity classes and environments used. It must refer to the implementation of your techniques.

Unity3D Engine (2021.2.18f1) is the course tool; however, you can use models from other courses, or those from the Unity Asset Store Marketplace, or TurboSquid, as part of your submission. You must clearly state in your report or video any assets used from **Asset Store** or elsewhere.

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| ***IMPORTANT*** |
| 1. ***Components/Assets/Code of the project which are you marked on (based on the mark scheme) must be your own.*** 2. ***You must develop your experience solely using the tools and software similar to the software currently on the DMU lab machines. I will be testing with Unity 2021.3.18, The Meta XR plugin and various Unity XR plugins on a Meta Quest 2 Headset (256GB)*** 3. ***The DMU labs have 2021.3.14f1 loaded. It should be compatible with 2021.3.18.*** |

**Submitting:**

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| **Unity3D Experience Project GitHub link** | *Submission through the*  ***Assignment*** *Link via Learning Zone* |
| **Unity Project Executable built for Meta Quest 2.** | *Submission through the*  ***Assignment*** *Link via Learning Zone* |
| **TDR Report (500 words)** | *Submission through the* ***Turnitin*** *link via Learning Zone* |

**Further Instructions:**

When submitting your project, please make sure your Unity3D VR project contains your: 1. Executable **Unity3D VR Experience** (posted to Learning Zone) and

2. the **project source code** available through your **GitHub** Link.

Please make sure of the following:

* Make sure that your project is **Unity3D 2021.3.14 built for the Meta Quest 2.**
* It contains your full **project**.
* It is on the correct **platform** (**Meta Quest 2**)
* **Double check your GitHub repository before submission**

*Once submitted, the project will not undergo:*

* Building project executable
* Switching Unity3D versions
* Switching platforms
* Searching for missing assets
* Your submission will be marks ***as is***.

Only the GitHub link should be provided as the Learning Zone attachment TXT File. **DO NOT email the link**. The last modified date in the GitHub Repository **MUST** be before the deadline, otherwise it will be classified as late.

Keep the project executable under 2GB (Learning Zone assignment limit). Remember, this module is not how the game looks via visual assets, rather proper use of C# within the Unity3D Engine.

**NOTES:**

Make sure you use the Unity3D Project Type when initially setting up the Project Repository, so the Intermediate files and other files are NOT pushed to the Repository.

The Project Repository **README** File should contain a short description of the project, along with your student P-Number.

DO NOT email me the project link or the Turnitin link, use official DMU submission channels only. Any such links will be considered SPAM and be discarded

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| **Develop a Cross-Platform VR Experience Using the Unity3D Engine - 80% of Total Module Mark** | | | | | | | |
|  | **0 - 29%** | **30 - 39%** | **40 - 49%** | **50 - 59%** | **60-69%** | **70 – 89%** | **90 - 100%** |
| ***Gameplay and***  ***Techniques***  **(80) – See below for breakdown.** | No or very little *gameplay or techniques* implemented | Minor attempt to include *gameplay*, very incomplete implementation of the techniques. | Some attempt to include good *Gameplay* elements, but incomplete implementation of the techniques. | Overall decent *Gameplay*, but a with only a basic techniques implementation. | Good *Gameplay*, however, a lack of innovation, or good basic techniques integration with  Meta Quest 2 VR format, prevented obtaining a higher mark. | Excellent use of  *Gameplay* elements and basic techniques. Excellent integration with Meta Quest 2 VR format. | ***Innovation,*** |
| ***1. Gaze-based***  ***interaction* (10)** | ***No explicit use of gazebased interaction technique*** | ***Minor and limited use of the gaze-based interaction technique*** | ***Some limited use of the gaze-based interaction technique*** | ***Overall fair use of the gazebased interaction technique*** | ***Good use of the gazebased interaction but limited integration with the rest of the game.*** | ***Excellent use the gaze-based interaction including effective with vision outlined in the TDR report*** |
| ***2. Controllerbased interaction (10)*** | ***No explicit use of the***  ***Meta Quest 2 Controllers in the experience was presented*** | ***Minor and limited use of the Meta Quest 2 Controllers in the experience was presented*** | ***Some limited use of the Meta Quest 2 Controllers in the experience was presented*** | ***Overall fair use of the Meta Quest 2 Controllers in the experience was presented*** | ***Good use of the Meta***  ***Quest 2 Controllers in the experience was presented but limited integration with the rest of the experience.*** | ***Excellent use of the Meta Quest 2 Controllers in the experience was presented including effective integration in line with vision***  ***outlined in the***  ***TDR report*** |  |

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| ***3.*** | ***UI Interaction***  ***(10)*** | ***No explicit use of UI Interaction was present in the experience*** | ***Minor and limited use of UI interaction was present in the experience*** | ***Some limited use of UI interaction was present in the experience*** | ***Overall fair use of the UI interaction was present in the experience*** | ***Good use of UI interaction was UI interaction was present in the experience but limited integration with the rest of the experience*** | ***Excellent use of the UI***  ***Interaction was present in the experience, including effective integration in line with vision outlined in the technical deign report*** |  |
| *4.* | ***Scene***  ***Managemen***  ***t*** *(10)* | ***No explicit use of Scene Management techniques was present in the experience.*** | ***Minor and limited use of Scene Management techniques was present in the experience.*** | ***Some limited use of Scene Management techniques was present in the experience.*** | ***Overall fair use of Scene***  ***Management techniques was present in the experience.*** | ***Good use of***  ***Scene***  ***Management techniques was present in the experience, but limited integration with the rest of the game*** | ***Excellent use of***  ***Scene Management techniques was present in the experience including effective integration in line with vision outlined in the technical deign report*** |
| *5.* | ***Character/***  ***Avatar***  ***Movement***  ***(10****)* | ***No explicit use of character/ avatar movement was present in the experience*** | ***Minor and limited use of character/ avatar***  ***movement was***  ***present in the experience*** | ***Some limited use of character/ avatar movement was present in the experience*** | ***Overall fair use of character/ avatar movement was present in the experience*** | ***Good use of character/ avatar movement was present in the experience but limited integration with the rest of the game*** | ***Excellent use of the character/ avatar movement was present in the experience including effective integration in line with vision outlined in the*** |

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|  |  |  |  |  |  |  | ***technical deign report*** |  |
| *6.* | ***Physics,***  ***Lighting and***  ***Effects (10)*** | ***No explicit use of Physics or lighting effects were present in the experience*** | ***Minor and limited of Physics or lighting effects were present in the experience*** | ***Some limited use of Physics or lighting effects were present in the experience*** | ***Overall fair use of Physics or lighting effects were present in the experience*** | ***Good use of Physics or lighting effects were present in the experience but limited integration with the rest of the game*** | ***Excellent use of Physics or lighting effects were present in the experience including effective integration in line with vision outlined in report or video.*** |
| ***7.*** | ***Player Comfort*** | ***No explicit use of Player comfort techniques was present in the experience*** | ***Minor and limited of Player comfort techniques was present in the experience*** | ***Some limited use of Player comfort techniques was present in the experience*** | ***Overall fair use of Player comfort techniques was present in the experience*** | ***Good use of Player comfort techniques was present in the experience but limited integration with the rest of the game*** | ***Excellent use of Player comfort techniques were present in the experience including effective integration in line with vision outlined in report or video.*** |  |
| ***8.*** | ***Optimization*** | ***No explicit use of optimization techniques was present in the experience*** | ***Minor and limited of optimization techniques was present in the experience*** | ***Some limited use of optimization techniques was present in the experience*** | ***Overall fair use of optimization techniques was present in the experience*** | ***Good use of optimization techniques was present in the experience but limited integration with the rest of the game*** | ***Excellent use of optimization techniques were present in the experience including effective integration in line with vision outlined in report or video.*** |  |

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| **Written Report or Video Presentation – 20% of Total Module Mark** | | | | |  |  |  |
|  | **0 - 29%** | **30 - 39%** | **40 - 49%** | **50 - 59%** | **60-69%** | **70 – 89%** | **90 - 100%** |
| **Written Report (100%)** | No or very poor report.  Not submitted to  Turnitin (Report) | No clear vision or incorporation of the report. | A minor attempt however lacks descriptions, critical analysis of implantation and structure. Poor grammar and/or expression problems. | A reasonable attempt at a report with some descriptions, critical analysis of implantation and structure. Some grammar and/or expression problems | Overall, a good attempt at a report with good  descriptions, critical analysis of implantation and structure but minor grammar and/or expression problems. | Excellent report with excellent descriptions,  critical analysis of implantation and structure with excellent use of grammar, formatting,  and clarity of expression. | Outstanding report with excellent descriptions,  critical analysis of implantation and structure with excellent use of grammar, formatting, and  clarity of expression. |

# IMAT 3002 Coursework Marking Scheme (REV. 1)