THE GLASGOW SCHOOL OF ART

Glasgow School of Art Course Specification
Course Title: Immersive Systems 2

Please note that this course specification is correct on the date of publication but may be subject to amendment prior to the start of the 2023-24 Academic Year.

Course Code:	HECOS Code:	Academic Session:
UISD202		2023-24

1. Course Title:
Immersive Systems 2

2. Date of Approval:	3. Lead School:	4. Other Schools:
PACAAG April 2020	School of Innovation and Technology	N/A

5. Credits:	6. SCQF Level:	7. Course Leader:
40	8	Daniel Livingstone

8. Associated Programmes:
BSc Immersive Systems Design

9. When Taught:
Semesters 1 & 2

10. Course Aims:
To extend knowledge in software development, 3D modelling and Immersive Systems. To provide a deeper understanding of core programming and interactive systems development skills, and immersive system design methodologies.

This will include:
- More advanced knowledge and skills for developing 3D models and content, including introduction to photo-realistic rendering and graphic communication
- Introduction to intermediate topics in software design and development with high-level programming languages, including software architecture design
- Demonstrate ability to develop immersive 3D experiences using a 3D game engine and Virtual Reality (VR) hardware systems (e.g. Head Mounted Devices - HMD)
- Introduction to user interaction design issues for VR and mobile platforms

11. Intended Learning Outcomes of Course:
By the end of this course students will be able to:

- Demonstrate knowledge of essential programming techniques, data structures, abstract data types and design patterns

- Demonstrate an ability to design an immersive system according to user requirements
- Demonstrate an ability to develop more complex interactive experiences using a 3D game engine
- Demonstrate ability to apply intermediate 3D modelling skills and a deeper understanding in 3D modelling applications
- Demonstrate an ability to assess and evaluate the usability of immersive systems

12. Indicative Content:

- Computer Programming for Immersive Systems
  - Introduction to programming with Data Structures and Abstract data types
  - Introduction to software architecture design patterns
  - Introduction to Markup Languages (XML, HTML, Json, etc.)
- Introduction to Graphic Communication in Immersive Systems
- Immersive Systems and Virtual Reality
  - Software system architectures, serialization and data driven design
  - Intermediate scripting
  - Run-time animation and physics
  - The usability of immersive systems
- Modern software development methodologies (e.g. prototyping and agile methods, UML)
- 3D Modelling
  - 3D modelling for different run time and pre-rendered environments
  - Intermediate Lighting, Rendering and Post Production
  - Animating materials
  - Introduction to Character design
  - Project Planning for modelling and animation

13. Description of Summative Assessment Methods:

Assessment Method	Description of Assessment Method	Weight %	Submission week (assignments)
Portfolio of work	Immersive Systems Portfolio	100	Portfolio of work developed over duration of Immersive Systems submitted in week 27

13.1 Please describe the Summative Assessment arrangements:

1. Portfolio of short programming projects to demonstrate ability to develop simple structured and object oriented programs
2. Simple 3D modelling portfolio to demonstrate fundamental competences with 3D modelling
3. Two practical lab tests will present students with incomplete programs with a number of errors that need fixed, and a list of desired changes. Students will have three hours for each lab test in which to attempt to complete the set of practical objectives.
   As an alternative, students may be provided with an opportunity to work on a similar challenge under less time-constrained conditions.

14. Description of Formative Assessment Methods:

Engagement with formative assessment is a mandatory requirement.
Regular progressive reviews will be conducted with students during their programming and 3D project work.

14.1 Please describe the Formative Assessment arrangements:
Formative assessment will be conducted through in-class discussion and demonstration in combination with individual feedback.

15. Learning and Teaching Methods:	
Formal Contact Hours	**Notional Learning Hours**
96	400
15.1 Description of Teaching and Learning Methods:	
In class lab assessments and class tests: Assessed labs present students with practical computing problems, requiring completion during an assessed lab session. Alternatives may be arranged with students as required. Timetable: Immersive systems will be taught over both semesters, based around two two-hour sessions each week, with longer sessions for lab tests as required.	

16. Pre-requisites:
Successful completion of Stage 1 (or equivalent)

17. Can this course be taken by Exchange/Study Abroad students?	Yes
18. Are all the students on the course taught wholly by distance learning?	No
19. Does this course represent a work placement or a year of study abroad?	No
20. Is this course collaborative with any other institutions?	No
20.1 If yes, then please enter the names of the other teaching institutions:	
N/A	

21. Additional Relevant Information:
N/A

22. Indicative Bibliography:
This course may be taught using any suitable programming, scripting, and markup languages (e.g. Python, C#, XML, Json) For C#, an indicative bibliography would include: Anon 2015. *C# Fundamentals: Development for Absolute Beginners (Channel 9)*. [online] Channel 9. Available at: <https://channel9.msdn.com/Series/C-Sharp-Fundamentals-Development-for-Absolute-Beginners> [Accessed 6 Jul. 2015]. Freeman, E., Robson, E., Bates, B. and Sierra, K., 2004. *Head First Design Patterns*. 1 edition ed. Sebastopol, CA: O'Reilly Media. Miles, R., n.d. *The C# Programming Yellow Book*. Stephens, R., 2014. *C# 5.0 Programmer's Reference*. 1 edition ed. Indianapolis, IN: John Wiley & Sons. The course will also utilise a current game engine, and physical computing with a low-cost hardware platform such as Raspberry Pi or Arduino. Possible books and resources would include: Allan, A., Coleman, D. and Mistry, S., 2015. *Make: Bluetooth: Bluetooth LE Projects with Arduino, Raspberry Pi, and Smartphones*. 1 edition ed. Maker Media, Inc.

Hoile, C., Bowman, C., Meijer, S.D., Corteil, B., Orsini, L. and Mott, T., 2014. *Make: Raspberry Pi and AVR Projects: Augmenting the Pi's ARM with the Atmel ATmega, ICs, and Sensors*. 1 edition ed. Maker Media, Inc.

For 3D Modelling, links to web based resources will be provided, e.g.:
Autodesk, n.d., *Autodesk Knowledge Network,* https://knowledge.autodesk.com/
Lynda, n.d., *Lynda.com,* http://lynda.com