THE GLASGOW SCHOOL OF ART	**Course Specification**

Course Code:	**Session:**
PIHV201	2017/18

1. Course Title:
Data Acquisition & Processing

2. Date of production / revision:
23 April 2014

3. Level:
SCQF 11

4. Credits:
30

5. Lead School/Board of Studies:
School of Simulation and Visualisation

6. Course Contact:
Daniel Livingstone

7. Course Aims:

- Introduce the theory and practice of 3D scanning technologies as an approach to data acquisition for heritage visualisation
- Provide students with skills for carrying out 3D scanning using survey methodologies and techniques
- Explain metadata recording for all data acquisition, describe a sound workflow and instil its importance for digital archiving
- Enable students to conduct and manage a small scale self-contained heritage visualisation project

8. Intended Learning Outcomes of Course:

By the end of this course students will be able to:

1. Demonstrate extensive and detailed knowledge and understanding in 3D scan survey methodology for example projects from data capture through backup, registration and its associated error reporting plus how they process the data to create a mesh, and archiving methodology of the acquired digital documentation.

2. Use a significant range of the principal skills, techniques, and equipment which are associated with data acquisition and processing for heritage visualisation, e.g. 3D scanner, data registration and processing, and photographing an example structure, site or object(s) for both documentation, including nodal photography, and for the production of interpretation materials.

9. Indicative Content:

This course will cover issues including

- Common surveying methodologies and techniques
- Understanding the uses and limitations of a range of 3D data acquisition scanning devices and methods such as:
  Terrestrial and airborne laser scanning
  Hand laser scanning
  White light scanning technology (Artec)
  Kinect / Consumer 3D scanners
  Digital photogrammetry
- Capture resolution, range and accuracy of 3D laser scanning
- Complete pipeline from data acquisition, processing, 3D reconstruction, to presentation and interpretation of the heritage structure, site or object/s, including:
  Processing of laser scanner data
  Register scan data, export the data and process it to create mesh data
  Mesh processing and visualisation stages
- Case studies in 3D data acquisition and processing, e.g. Edinburgh UNESCO World Heritage site (or the Scottish TEN project)
- Basics of DSLR Photography & digital photography using nodal points & how to process the data and overlay the results onto terrestrial laser scan data
- Metadata, back-up and archiving methodologies
- Risk assessment for field work, associated risks when acquiring digital data in the field to the personnel involved, the public and the heritage structure, site or object itself
- Various software packages for data processing and visualisation e.g. Leica Cyclone, 3D Reshaper, PhotoScan, qGIS

10. Description of Summative Assessment:

No.	Assessment Method	Description of Assessment Method	Weight %	Submission week (assignments) or length (exam)
1	Coursework	Group work: Processing and preparation of data for visualisation (fly-through or interactive) and archive	40	Week 12 (indicative)
2	Coursework	Individual Report and Log Books	60	Week 12 (indicative)

For this course, students are assessed through a group project with individual components, and

individual reports (2000 words) plus log book. Coursework weighting: Groupwork: Processing and preparation of data for visualisation (fly-through or interactive) and archive: 40% Individual report and log book: 60%
10.1 Please describe the Summative Assessment arrangements:
The learning outcomes will be assessed through a group fieldwork project for data acquisition and visualisation. This will entail working with the raw data demonstrating competency in approach to a scanning project, recording metadata, following back up procedures, registering, processing the data, creating mesh models and using these in a visualisation. The students should be able to apply knowledge and understanding of key visualisation techniques to create a simple visualisation of the processed data.

11. Formative Assessment:
Regular tutorials and reviews during timetabled labs allow tutors to provide formative feedback to students on their progress.
11.1 Please describe the Formative Assessment arrangements:
4T

12. Collaborative:	
Yes ☐	**No** ☒
12.1 Teaching Institutions:	
4T	

13. Requirements of Entry:
Students must have experience with 3DS Max or similar 3D modelling package.

14. Co-requisites:
None

15. Associated Programmes:
MSc Visualisation (International heritage)

16. When Taught:
Spring semester

17. Timetable:
Timetable will be available in the induction week.

18. Available to Visiting Students:	
Yes ☒	**No** ☐

19. Distance Learning:	
Yes ☐	**No** ☒

20. Placement:	
Yes ☐	**No** ☒

21. Learning and Teaching Methods:		
Method	**Formal Contact Hours**	**Notional Learning Hours** (Including formal contact hours)
Lecture	12	12
Studio		
Seminar/Presentation	3	3
Tutorial		
Workshop		
Laboratory work	15	15
Project work	12	162
Professional Practice		
E-Learning / Distance Learning		
Placement		
Examination		
Essay		
Private Study	Not Applicable	90
Other (please specify below)	18	18
TOTAL	**60**	**300**

22. Description of "Other" Teaching and Learning Methods:
Fieldwork of at least three days equivalent is a core feature of this class, providing practical experience of data-acquisition in a realistic setting. Supervised field trips for data-acquistion will be arranged by the course tutors.

23. Additional Relevant Information:
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24. Indicative Bibliography:
Journals: Journal of Cultural Heritage, Elsevier ACM Journal on Computing and Cultural Heritage, ACM, ISSN 1556-4673, EISSN 1556-4711 International Journal of Heritage in the Digital Era, Multi-Science Publishing Company, ISSN 2047-4970 Books: Ioannides, M., et al (eds.), (2012) *Progress in Cultural Heritage Preservation - 4th International Conference*, EuroMed 2012, Lemessos,, Available at:

http://www.springer.com/computer/information+systems+and+applications/book/978-3-642-34233-2 [Accessed May 4, 2014].

Stanco, F., Battiato, S., and Gallo, G. (Eds.), (2011) *Digital Imaging for Cultural Heritage Preservation: Analysis, Restoration, and Reconstruction of Ancient Artworks*. CRC Press, ISBN 978-1439821732