

COURSE CONTENT

Course Code	DD2013 (DD8010)
Course Title	Visualisation of Cultural Heritage
Pre-requisites	NIL
No of AUs	3
Contact Hours	39 hours studio contact

Course Aims

This course will introduce you to the different stages of visualising an object for cultural heritage processing. This course is composed of acquiring the basic theoretical skills and the function of the equipment to be used. A second part is when academic skills are translated into an actual project by converting theory into practice. The course will give you the tools to develop your skills using real specimens related to cultural heritage. You will be presented with a broad range of techniques to analyse and document the biography of an example. This learning will provide the foundation for more advanced investigations into cultural heritage and technology.

Intended Learning Outcomes (ILO)

By the end of the course, you should be able to:

1. Identify and discuss the main techniques to acquire and visualise data.
2. Use data gathering equipment and software to visualise acquired data.
3. Generate interpretations and narratives around cultural heritage artefacts.
4. Develop a research practice and apply the acquired fundamental skills to the given artefacts.
5. Contribute to the learning environment by participating positively in-class discussion and presenting your work clearly and cohesively.

Course Content

What is Cultural Heritage Visualization?

The course explores current debates about the broad range of techniques used to analyse and document the specimen biography. The aim is for you to gain experience in learning what can be derived about the “hidden history” of an object and build visualisation and storytelling out of accurate data.

You will design experimental procedures, discover techniques that can be used to learn more about artefacts and curate an interactive and visually appealing platform to display the collected data to engage the public. The project will turn the numerical data into pictorial to present data to the public.

Collecting and building information

You will learn how to apply basic techniques to investigate and visualise cultural heritage objects. Using equipment and software, you will be able to:

- (i) Gather data by using equipment
- (ii) Interpret and visualise the data

This process can be applied to different contexts; thus, the course is open to all NTU students.

How to acquire data that is behind an exhibited object

You will be introduced to research on cultural heritage artefacts and exposed to authentic case studies. This will occur by being exposed to fundamental instrumental analysis to help you acquire information about the object biography.

How to visualise the data

By analysing various data, you will comprehend the different requirements for conceiving meaningful narratives from that data. A digital interface will be created to develop storytelling and to experience the data. During this process, you will increase your awareness of the value of applying scientific approaches to cultural heritage and then using this to visualisation and storytelling development.

Class assignment

Periodically, there will be critical readings on the assigned topics and two short presentations. The final project will contain a proposal - using different media - to display the acquired data on various devices available in NTU School of Art Design and Media and, online, on Engineering Historical Memory (i.e., touchscreen, 3D TV, videowall, projection mapping, website, blog, conference poster, publication documentation, dome theatre). The final project will be complemented by a concise but comprehensive report focusing on developing your preferred topic as agreed with the instructor.

Assessment (includes both continuous and summative assessment)

Component	ILO Tested	Programme LO	Weighting	Team/ Individual
Continuous Assessment LIBER Lab exercises (20%) Class Presentations (20%)	1,2,3	--	40	Individual
Final Project: Final individual or group project	1,2,3,4	--	40	Individual
Continuous Assessment: Participation	5	--	20	Individual
Total			100%	

Reading and References

NANETTI, A. (2021). "Defining Heritage Science. A Consilience Pathway to Treasuring the Complexity of Inheritable Human Experience through Historical Method, AI and ML." *Complexity*, vol. 2021, special issue on *Tales of Two Societies: On the Complexity of the Coevolution between the Physical Space and the Cyber Space*, edited by CHEN S.-H. (Lead Editor), S. Alfarano and D. Shen (Guest Editors), Article ID 4703820.

NANETTI, A., & BENVENUTI, D. (2021). "Crafting the Next Generation of Web-based Learning Tools for Manuscript Artefacts. A Focus on Science, Technology, and Engineering Codices, World Maps, and Archival Documents in Museum Systems." *SCIRES-IT (SCientific REsearch and Information*

Technology), 11(1).

NANETTI, A., BENVENUTI, D., BIGONGIARI, M., RADZI, Z., & BERTOCCI, S. (2020). "Animation for the Study of Renaissance Treatises on Architecture. Francesco di Giorgio Martini's Corinthian Capital as a Showcase." *SCIRES-IT (SCientific RESearch and Information Technology)*, 10(2), 19-36.

^~NANETTI, A., & BENVENUTI, D. (2019). "Animation of two-dimensional pictorial works into multipurpose three-dimensional objects. The Atlas of the Ships of the Known World depicted in the 1460 Fra Mauro's *mappa mundi* as a showcase". *SCIRES-IT (SCientific RESearch and Information Technology)*, 9(2), 29-46.

LUO, S. S., SHEDD, B. A., & NANETTI, A. (2018). "Enhancing the Experience of the Western Xia Imperial Tombs Heritage Site (PRC, Ningxia) through Animated Installations." *SCIRES-IT (SCientific RESearch and Information Technology)*, 8(1), 1-32.

NANETTI, A., CATTANEO, A., CHEONG, S. A., & LIN, C. (2015). "Maps as Knowledge Aggregators: from Renaissance Italy Fra Mauro to Web Search Engines." *The Cartographic Journal*, 52(2), 159-167.

LUO, S., 从现实到虚拟：中国文化遗产的沉浸式体验设计 / FROM REALITY TO VIRTUAL: IMMERSIVE EXPERIENCE DESIGN OF CHINESE CULTURAL HERITAGE. BEIJING: FOREIGN LANGUAGES PRESS.

Course Policies and Student Responsibilities

(1) General

You are expected to complete all assigned readings, activities, assignments, attend all classes punctually and complete all scheduled assignments by due dates. You are expected to take responsibility to follow up with assignments and course-related announcements. You are expected to participate in all project critiques, class discussions and activities.

(2) Punctuality

You are expected to be punctual for all classes. If you are more than 30 minutes late, you will be deemed absent and will not be able to sign on the attendance register.

(3) Absenteeism

In-class activities make up a significant portion of your course grade. Therefore, absence from class without a valid reason will affect your participation grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is essential that you recognise your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively

equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion, and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Planned Weekly Schedule*

*Subject to adjustment by the instructor according to the teaching situation, students' progress, public holidays, and unforeseeable circumstances. A revised schedule will be issued to students at the start of the semester.

Week	Topic	Course LO	Readings/ Activities
1-3	<p>Fundamental issues in Cultural Heritage</p> <p>Overview of the contemporary critical issues in Cultural Heritage preservation and conservation. Semantic and methodological evolution of the concepts in “Cultural Heritage”.</p> <p>Relevance of the distinction for the development of present awareness of Cultural Heritage at both tangible and intangible level.</p> <p>What is and what for visualising cultural heritage</p> <p>Cultural Heritage sites between accessibility, gentrification and raising awareness.</p> <p>Access: from Rock painting to the endangered sites.</p> <p>Gentrification: examples</p> <p>Awareness: class discussion</p> <p>Concepts in Visualisation of Cultural Heritage</p> <p>Approaches to artefacts: objects, gestures, and biographies.</p> <p>Understanding objects through visual inspection.</p>	1,2, 3, 5	<p>Introductory Lecture</p> <p>In-class discussion on personal experience of Cultural Heritage.</p> <p>Class participatory exercise: what is Visualization of Cultural Heritage for you.</p> <p>Assigned Readings</p> <p>Leading agencies statements: UNESCO, ICOM, ICOMOS, ICCROM.</p>

	An overview on selected heuristics applied to document and investigate an artefact		
4-6	<p>Concepts in Visualisation of Cultural Heritage</p> <p>Approaches to artefacts: objects, gestures, and biographies.</p> <p>Understanding objects through visual inspection.</p> <p>An overview on selected heuristics applied to document and investigate an artefact</p> <p>What documenting/investigative techniques for what purpose</p> <p>Exploration of strategies to collect visual information out of an artefact.</p> <p>2D and 3D imaging at macro and micro scale.</p> <p>Practising concepts through connection data and images, creating and editing meaningful storytelling.</p> <p>Introduction to digital visualisation techniques</p> <p>Foundations of the digital technologies applied to cultural heritage objects. History of the techniques, their development, and actual heuristics available</p>	1,2, 3, 5	<p>Lectures on heuristics to document, investigate and visualise artefacts from Cultural Heritage context</p> <p>Assigned Readings Articles/chapters selected according to the matter of interest.</p> <p>Key text: TBA</p> <p>Self-directed background reading</p>
7	Heritage Conservation	1, 2, 3, 4, 5	<p>Assigned Readings</p> <p>Selection of chapters to be assigned for team-working.</p>
8-10	<p>Visualisation techniques</p> <p>Going beyond the traditional narrativity in Cultural Heritage. The basic requirement for conceiving CH narratives.</p> <p>Building an interactive storytelling</p>	1, 2, 3, 4, 5	<p>LIBER Lab</p> <p>Tutorial with Master Students</p>

	Mixed reality		
11	Practical work on projects assigned to the students (team working)	1, 2, 3, 4, 5	LIBER Lab
12	Critical revision of the project	1, 2, 3, 4, 5	LIBER Lab
13	Presentation of the Final Project	1, 2, 3, 4, 5	LIBER Lab