6. Higher Education Curriculum - DRAFT

The proposed Curriculum is organized in the following modules according to the CULT vision:

1. Digital Technologies for Cultural Heritage
2. Technologies for Extended Reality
3. Web 3D and Immersive Communication
4. Artificial Intelligence for Digital Heritage Innovation
5. Video-game Design and Development for Cultural Heritage

Each module considers the following learning dimensions

- Cognitive (learning by thinking) is to be used in a blended mode, mixing classroom seminars and e-learning with Open Educational Resources on gaming and gamification, with distinctive creativity skills and art-inspired innovation.
- Operational (learning by doing) with workshop sessions held by the teachers/trainers/experts of the partnership beneficiaries of the mobility to support the students in the conception, design and implementation of gamified and interactive digital solutions, able to exploit the potential of technology to enhance the experience factors in cultural fruition and to train, inform and raise awareness of culture in diversified user ranges in a challenging way.
- Behavioural (learning by acting), through a session of work-based learning, carried out in companies of cultural promotion and communication, production of edutainment and/or digital solutions partners and/or involved in the partnership, where the students will be called upon in the first person to face and solve real problems of a relational, negotiation, design, management and technological nature, making themselves protagonists of the entire implementation process of the digital solutions.

6.1 - Digital Technologies for Cultural Heritage

6.1.1. Module Description

This module explores the role of digital technologies in the documentation, preservation, communication, and enhancement of cultural heritage. Students will develop a critical understanding of how digital tools can be strategically applied in the cultural sector to increase accessibility, foster engagement, and support preservation. Emphasis is placed on the design of digitization projects tailored to specific heritage contexts, including the selection and evaluation of appropriate technologies and methods.

Duration: 20 hours

6.1.2. Learning Objectives

D1 – Knowledge and Understanding Skills

Upon successful completion, students will:

- Understand the challenges and opportunities in the digital communication of tangible and intangible cultural heritage.
- Gain foundational knowledge of key technologies (e.g., 3D scanning, GIS, photogrammetry, digital storytelling, AR/VR) used in heritage digitization.

- Become familiar with international standards, protocols, and metadata frameworks for heritage digitization (e.g., Europeana, Dublin Core, CIDOC CRM).

D2 – Ability to Apply Knowledge and Understanding

Students will be able to:

- Design and plan a digitization project for a specific cultural heritage asset, aligning objectives with appropriate technologies and communication strategies.
- Select and justify the most suitable technical approach (e.g., 2D/3D digitization, database structuring, immersive experiences) based on the nature and goals of the project.
- Create a basic prototype or conceptual model for digital enhancement (e.g., interactive map, 3D model viewer, web-based archive).

D3 – Autonomy of Judgment

By the end of the course, students will:

- Critically evaluate the appropriateness, sustainability, and ethical implications of different digitization techniques.
- Compare and judge digitization strategies in relation to cost, access, preservation, and user engagement.
- Assess case studies and real-life projects to identify best practices and areas for improvement.

D4 – Communication Skills

Students will learn to:

- Clearly articulate and document their technological and methodological decisions in project reports and oral presentations.

- Engage stakeholders from different backgrounds (e.g., curators, IT specialists, educators) in the planning and execution of digital heritage projects.
- Produce effective digital storytelling and user engagement strategies tailored to diverse audiences (e.g., tourists, researchers, students).

D5 – Learning Skills

Students will demonstrate the ability to:

- Continuously update their knowledge on emerging digital technologies and standards in the cultural heritage domain.
- Compare new and traditional approaches, evaluate the impact of innovation, and propose creative new directions for digital heritage projects.
- Reflect on their learning process and design self-directed study paths for professional development in the digital heritage field.

6.1.3. Content Structure

- Introduction to Cultural Heritage

- Digital, Public and Open History

- Digital Humanities / Citizen Science

- Open Access / Open Source

- Linked Open Data

- Crowdsourcing

- Communication Design

- Information Visualization

- Interface Design

6.1.4. Learning Process

6.2 - Technologies for Extended Reality

6.1.1. Module Description

This module introduces students to the technological foundations and design principles of Extended Reality (XR), encompassing Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). Through a blend of theoretical grounding and hands-on development, students will explore the tools, techniques, and challenges involved in designing immersive and interactive XR experiences. Special attention will be given to the integration of human-centered design principles, interaction models, and the critical analysis of XR systems in real-world contexts.

Duration: 20 hours

6.1.2. Learning Objectives

- Define and explain the core concepts and distinctions of XR (VR, AR, MR).
- Identify and analyse technical and experiential requirements for immersive XR systems.
  Understand and evaluate key XR hardware (e.g., HMDs, controllers, sensors) and software frameworks.
  Apply user-centered design principles to XR interaction and interface design.
  Create digital assets and design meaningful interactions within XR environments.
- Develop a functional XR prototype addressing a real-world issue involving human interaction.
- Assess the feasibility and constraints of XR systems and projects, including technical, ethical, and user-experience considerations.

6.1.3. Content Structure

Extended Reality (XR) encompasses various immersive technologies that can blend physical and virtual worlds, including virtual reality (VR), augmented reality (AR), and mixed reality (MR).

This course is an introduction to the fundamental techniques and practical applications of Extended Reality. We will cover several topics: concepts in XR, human perception, immersion and presence, virtual world modelling, real-time simulation, input and output devices, design principles for XR, and case studies.

6.1.4. Learning Process

Lectures, Exercises,

These topics will be explored through a combination of lectures, individual assignments, and a final project to develop an XR application.

The latter will be developed in Unity; familiarity with the software is welcomed but not a fundamental prerequisite.

6.3 - Web 3D and Immersive Communication

6.1.1. Module Description

This module explores the evolution of web design into immersive and interactive environments, focusing on the integration of 2D and 3D graphic design within web interfaces. Through both theoretical and hands-on approaches, students will learn how to design user-centered interfaces, create digital assets, and develop immersive experiences such as virtual tours and digital archives. The course combines principles of traditional web design with cutting-edge immersive technologies to prepare students for the future of interactive communication.

Duration: 20 hours

6.1.2. Learning Objectives

- Understand the principles of web design and graphical interface development.
- Create and evaluate wireframes and 2D graphical assets for the web.
- Design and integrate UI components such as buttons, fonts, icons, and animations.
- Explore and apply 3D web technologies in the creation of virtual tours.
- Analyse immersive platforms and their impact on user engagement.
- Develop user interfaces for immersive and archival web applications.
- Design and prototype a web-based digital archive integrating immersive elements.

6.1.3. Content Structure

Introduction to Immersive Web Communication, Web 3D and Virtual Tour Design. In this introductory session, students explore the historical and technological evolution of web design, with particular attention to how immersive and interactive environments are redefining user experience in cultural communication. Through this lecture, they become familiar with core concepts like user-centred design, spatial storytelling, and engagement strategies in digital media. The session includes an analysis of innovative examples in virtual museums and immersive exhibitions. They explore platforms like A-Frame or Three.js and learn how to create basic spatial interactions. With step-by-step guidance, they begin to develop simple 3D virtual tours that simulate a walk-through of a cultural space, enhancing narrative and spatial immersion.

2D Design and Wireframe Creation and Interactive Graphic Element Design. This activity focuses on the fundamentals of visual interface design. Students learn how to sketch wireframes using tools such as Figma or Adobe XD, applying basic UI/UX principles like navigation flow, visual hierarchy, and accessibility. Working individually, they develop prototypes for cultural or educational web platforms, simulating the structure of online museum portals or interactive exhibitions. This hands-on session also emphasises usability and aesthetics, encouraging students to develop component libraries that they can reuse in their later prototypes. Using software like Illustrator and Figma, they also experiment with basic animations (hover states, transitions) to enhance interactivity.

Immersive Platforms – Research and Analysis. In this session in teams, students research various immersive web platforms (such as Artsteps, Mozilla Hubs, and Sketchfab). They evaluate these tools based on user experience, accessibility, technical limitations, and educational potential. Presentations at the end of the session

help them consolidate their understanding of market trends and application possibilities in the field of cultural digitalisation.

UI Design for Immersive Environments and Prototyping an Immersive Digital Archive. Students adapt traditional 2D UI components to 3D or spatial contexts, focusing on how menus, instructions, and navigational aids function in virtual or augmented environments. This co-design session encourages iterative thinking and contextual design for immersive media. The result is a set of tailored UI components suited for inclusion in virtual exhibitions or archives.

Work-Based Simulation – Solving a Real-World Brief. This final activity is a simulation of a professional scenario where students, in teams, respond to a brief from a cultural institution or media partner. They apply all previously acquired skills to conceptualise and propose a full immersive web communication strategy. Teams present their prototypes and receive feedback in a mock client presentation. This promotes problem-solving, project management, and pitching skills.

6.1.4. Learning Process

Lectures, classroom/laboratory exercises, independent exercises with classroom review.

6.4 - Artificial Intelligence for Digital Heritage Innovation

6.1.1. Module Description

This module explores the transformative role of Artificial Intelligence (AI) in the preservation, interpretation, and dissemination of cultural heritage. Students will examine how machine learning, computer vision, natural language processing, and generative AI are applied to digitized collections, museum experiences, archival exploration, and cultural storytelling.

Duration: 20 hours

6.1.2. Learning Objectives

- **Demystify AI:** Gain a clear understanding of what AI is and how it can be used in a creative context. Learn how to ‘‘talk’’ to an AI-agent, how to craft great prompts, how to make your own helpers, and how to synthesize your desired result - moving beyond the hype and into practical applications.
- **Master Free Tools:** Learn to effectively use a curated selection of free and accessible AI tools for various creative domains, including music, image and video generation, storytelling, text generation, and creative research.
- **Develop Practical Skills:** Acquire hands-on experience in integrating AI tools into your existing creative workflows, enhancing your artistic process and expanding your creative possibilities.
- **Explore Diverse Applications:** Discover the wide range of creative applications for AI, from generating unique musical compositions and crafting compelling narratives to conducting innovative research.
- **Put It All Together:** Develop and complete a final project that showcases your newfound skills and demonstrates your ability to leverage AI tools for creative expression.

6.1.3. Content Structure

Harmonizing with AI: Music and Audio Creation Explore the exciting world of AI-powered music and audio creation. This module covers various techniques and tools to empower your musical creativity, regardless of your prior experience with music theory or production.

Visual Voyages: Image and Video Generation - Dive into the realm of AI-generated visuals. Discover how to create stunning images from text prompts, manipulate existing images with AI-powered tools, and even generate short video clips. This module will equip you with the skills to bring your visual ideas to life, whether you're creating art, designing graphics, or producing video content.

Narrative Nexus: AI for Storytelling and Text Generation - Unlock the power of AI for storytelling and text generation. Learn how to use AI to generate creative writing prompts, develop character backstories, write dialogue, and even create entire short stories or poems. This module will explore how AI can assist in overcoming writer's block, expanding your creative horizons, and enhancing your narrative skills.

Research Revolution: AI-Powered Creative Research - Revolutionize your research process with the help of AI. Discover how to use AI tools to make a creative diary of your thoughts, summarize information, and find inspiration for your creative projects. This module will show you how AI can become your invaluable research assistant, helping you to explore new ideas and deepen your understanding of any subject matter.

Your AI-Powered Final Project. Bring together all the skills and knowledge you've acquired throughout the course to create your own unique AI-powered creative project. This module will provide guidance and support as you develop, refine, and present your work, showcasing your

mastery of the tools and techniques covered in the previous modules. This final project will serve as a testament to your creative journey and a valuable addition to your portfolio. This is where you will combine elements from the previous modules, creating a cohesive and impressive final piece.

6.1.4. Learning Process

The module is structured around:

- Lectures & Seminars
- Hands-on Workshops
- Joint Research Projects

6.5 - Video-game Design and Development for Cultural Heritage

6.1.1. Module Description

This module integrates videogame design and development with cultural heritage, fostering interdisciplinary collaboration between academic institutions and cultural organisations. The program equips students with theoretical knowledge and practical skills in applying game design principles and interactive digital media to enhance cultural heritage experiences.

Duration: 20 hours

6.1.2. Learning Objectives

- Develop a foundational understanding of videogame design and development for cultural heritage.
- Gain hands-on experience with game engines, AI tools, and immersive technologies.
- Explore methodologies for interactive storytelling.
- Analyze the ethical and social implications of gamification in cultural heritage.

6.1.3. Content Structure

Introduction to Videogame Design for Cultural Heritage. History and theory of video games, Role of serious games in cultural preservation and education. Case studies of heritage-focused videogames. Video game language. Fundamentals of game design and mechanics.

Concept and Game Design. Introduction to game design. Design thinking for video games. From Game Concept to Game Design Document. Basics of video game scriptwriting

Interactive Storytelling & Narrative Design. Narrative structures and their application in cultural heritage games. Designing interactive museum experiences through games.

Game Development, Immersive Technologies and AI. Software Project Management and Software Engineering for gaming, Game engines (Unity, Unreal Engine) for cultural heritage. User experience. Augmented and Virtual Reality applications in heritage games. Video Game and AI

6.1.4. Learning Process

The module is structured around:

- Lectures & Seminars
- Hands-on Workshops
- Joint Research Projects
- Case Studies & Hackathons
- Studio Practice
- Industry Engagement