GEM – Course Concept and Experience Report

Listen to the waters: Water and Biodiversity

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GEM – Course Concept and Experience Report

Listen to the waters: Water and Biodiversity

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COURSE CONCEPT

Abstract

The Listen to the Waters: Water and Biodiversity main course took place from June 1st to June 6th, 2025, on Evia Island in Greece. The course aimed to create narratives and artworks that raise environmental awareness and enhance human perception of global water resources and biodiversity. It also aimed to explore ways of sustainable digital media production and reduced energy consumption. Moreover, it aimed to explore how new media experiences could be possibly embedded within natural environments. The course brought together more than 60 participants from eight European Universities and an art and innovation institute. It emphasised interdisciplinary and multicultural collaboration, enabling students and tutors with diverse backgrounds to contribute their expertise.

The Listen to the Waters course began with an online pre-workshop that took place from May 7th to May 28th, 2025. The pre-workshop consisted of four preparatory sessions that introduced participants to themes related to the course, such as interactive art, land art, augmented reality, geo-located media, radio and sound art, water biodiversity, low energy devices and renewable energy sources.

During the main course in Greece, students were divided into six multicultural and interdisciplinary groups. Each group consisted of 5-7 students, guided by 2-4 tutors and focused on one of the following subjects: Interactive art in nature, Augmenting Nature: AR walks in natural ecosystems, Radio Water (Biodiversity), Radio Fire (Biodiversity), Art for Futures Lab, Site-specific Ritual Theatre Performance/s, Water ecosystems: investigating the essence and the information that water carries.

The first day started with an introduction to the course concept, an introduction of participants and an initial brainstorming between members of each group. The first day also offered a guided tour at several natural locations on Evia Island, following the route of waters on the island: from the mountain springs to the river and the waterfalls, and finally to the sea. On the second day students collaborated on the designing of a project prototype on the themes of biodiversity and water, following the guidelines provided by the tutors of each group. On the third day students developed and tested their prototypes, while brainstorming and searching for solutions for more sustainable production and creativity in nature. The final presentations in the afternoon of the fourth day showcased artworks and creative applications including Interactive audiovisual installations using renewable energy sources, Augmented Reality in natural locations, Cinematic VR, video & sound art, radio programmes and performances. Sustainability and environmental awareness were key considerations of the artworks. The course leveraged various technologies, such as AR, VR, Head Mounted Displays, mobile technologies, radio transmitters, equipment for underwater audiovisual capture (underwater drones, hydrophones, 360 cameras), 3D scanners, physical computing equipment (sensors, actuators), low energy consumption devices (electronic microcontrollers) and renewable energy sources (such as solar panels). Learner support was a priority, with tutors assisting and guiding students, throughout the process. The collaboration of biodiversity experts from two Greek Universities brought new knowledge and provided interesting insights.

Course Description

Course Objectives

One of the main objectives of the course is to support the creation of narratives and artworks that raise environmental awareness and enhance human perception of global water resources and biodiversity. Another goal is to apply sustainable methods of digital media production based on reduced energy consumption. Finally, the course aims to investigate ways to blend human creativity with natural environments, by creating artistic experiences in, from and for nature.

Course Overview

This course aims to understand the current environmental challenges related to biodiversity loss, the impact of climate change on natural water supplies. It also aims to understand the impact of human activity and digital technologies on the environment.
In this course, 9 partner organisations including more than 40 students and 20 lecturers have joined. We aimed to focus on creative processes that raise environmental awareness and reduce energy consumption.
As a result of this course, artistic prototypes explore ideas related to biodiversity and natural water supplies, creating narratives and experiences that communicate existing environmental challenges, apply sustainable solutions and cultivate a symbiotic relationship to nature.

Planned schedule

The LTTW course consists of an online pre-workshop and the main workshop in Greece. The pre-workshop includes four weekly online sessions in May, 2025. During these sessions, experts in specific topics of the course give lectures to prepare participants for the main workshop. The lecture of the preparatory session cover the following topics

- Week 1:
    - Introduction to the Course.
    - Interactive Art in Nature
- Week2:
    - Water Biodiversity
    - Low energy devices and renewable energy sources for outdoor installations
- Week 3:
    - Introduction to Radio technologies & the Out of Office Radio Project
    - Sound Art in nature
- Week 4:
    - Augmented Reality & Geo-Located Art in Nature and Public Spaces

The planned schedule of the main workshop, taking place on Evia Island in Greece from June 1st to June 6th, 2025, is the following:

- Day 1
    - Get Together, welcome social event and dinner at local restaurants
- Day 2:
    - Inspirational discussion, project work (challenge introduction), commuting to sites in nature, welcome evening.

- Day 3:
    - Co-Creation, ideation, sketching, exploring the design options of concepts.

- Day 4:
    - Development of prototypes
- Day 5:
    - Presentation preparation
    - Presentations of results from all groups
- Day 6
    - Curriculum workshop
    - Departure

Problem Description

The climate crisis has profound and multifaceted impact on water resources globally, manifested either as water scarcity in some cases, or water excess in others. Global warming leads to prolonged droughts, more frequent and severe heat waves, and more intense wildfires. These extreme weather conditions reduce water availability by drying out rivers, lakes, and soil, particularly affecting arid and semi-arid regions. On the other hand, global warming accelerates polar ice melting, contributing to rising sea levels and increased flooding at coastal areas. Moreover, higher temperatures result in increased evaporation rates from water bodies and soil, further intensifying water stress in vulnerable areas. Simultaneously, the changing climate alters global and regional precipitation patterns. In some places, this means significantly less rainfall, while in others, leads to more intense rainfalls that cause local floods. These disruptions in the hydrological cycle threaten ecosystems and imbalance natural water supplies.
Human activity plays a significant role in exacerbating the environmental crisis. One often overlooked aspect is the environmental footprint of digital technologies. Although digital media are largely perceived as immaterial, their operation relies on a vast energy-consuming physical infrastructure. This includes data centers, servers, networks, and the manufacturing of electronic devices, all of which consume large amounts of electricity—often sourced from fossil fuels—and require significant water and mineral resources.
Furthermore, the growing demand for data storage and streaming services has increased the energy burden of the digital sector. Activities such as cloud computing, cryptocurrency mining, and artificial intelligence training contribute to gas emissions and strain already vulnerable natural supplies. The lifecycle of digital devices—from manufacturing to disposal—also has considerable ecological consequences, including over-extraction of non-renewable natural resources, extensive fossil fuel power consumption, vast emissions of air pollutants, and e-waste accumulation.

Guiding Questions

The main guiding questions are: How can we use digital creativity to create narratives and experiences that raise awareness on environmental issues, such as biodiversity loss and climate crisis's impact on natural water supplies? Can we apply more sustainable digital media production methods, based on reduced energy consumption and renewable energy sources? How can we embed artistic experiences in nature, in a respectful way?

Duration, Intensity & ECTS

The Listen to the Waters course begins with a one-month preparatory phase that includes four weekly online sessions of two hours each. The preparatory workshops, while not as intense as the main course, offer students critical knowledge and skills and require their

complete attention to learn fundamental concepts that will be useful in their future projects. The main course lasts six days, including four days of intensive, in person, collaborative work of approximately eight hours per day. During this timeframe, students are expected to collaborate efficiently to design and develop their prototypes. This process requires rapid ideation, prototyping, mid-pitch presentations, refining, and final presentations of the projects. The course's intensity fosters creative thinking, problem solving, and fast decision-making.
The amount of ECTS granted for this course is subject to the individual implementation of the universities. An indicative estimated total workload for the pre-course is two ECTS and for the main course two to three ECTS for the students.

Collaboration Mode

Collaboration plays a central role in achieving the Listen to the Waters course's objectives. It occurs both online and in person, spanning multiple levels—from teamwork among students from different countries and disciplines, to international collaboration among partner organisations, and collaboration with experts from other departments and Universities.

Student teams are intentionally formed to be both interdisciplinary and cross-cultural, bringing together individuals from diverse countries and academic backgrounds such as digital arts, film and TV Production, sustainable design, and cultural management, performance and more. Within these teams, students distribute tasks based on their skills and interests. This allocation of responsibilities facilitates collective work by combining complementary skills. Collaboration at the student team level fosters a culture of mutual learning, with students sharing their expertise and learning from one another.

Learning from peers is a key part of the course, not only within teams but also through group presentations and feedback sessions. Students discuss their work with other teams and receive feedback from tutors. This process fosters exchanging of ideas and brings insights into different approaches. Collaboration expands from academic to extracurricular activities. Students work together on various daily tasks and participate in recreational activities. These informal forms of collaboration foster cross-cultural learning and bond-building among participants.

Tutors apart from providing guidance, facilitate collaboration between team members. When needed, they act as mediators, helping resolve conflicts and ensuring smooth communication and inclusivity. They also can put in contact peers with complementary skills. Tutors also collaborate with their colleagues from partner universities, bringing in different perspectives and approaches to sustainability challenges and solutions.

The organisation of the course required international collaboration at a higher level between partner organisations. Regular meetings were held well in advance to coordinate the course. key component was inviting biodiversity and aquatic ecosystem experts to contribute to the course.
Collaborations were established with faculty from the Department of Agricultural Development, Agri-food and Natural Resources Management of the National and Kapodistrian University of Athens and the Department of Biology of the University of Crete, who offered lectures during the online preparation phase and served as tutors during the main course.

Finally, collaboration is facilitated by a range of digital platforms—such as video conferencing, cloud storage, and creative collaboration tools—which support communication and teamwork across all stages of the course, as described in more detail in the following section.

Digital Platforms, Tools & Technologies

The Listen to the Waters course uses a variety of digital platforms, tools and technologies to facilitate collaboration and communication, to support the design and development of the students' prototypes, and to support the overall learning experience. Some digital platforms, tools and technologies applied during the course are the following:

Video conferencing platforms, such as Zoom or Webex, are used for the online pre-course sessions

Cloud storage & file-sharing platforms, such as Google Drive or One Drive, are used throughout the workshop, for file storage and sharing between participants

Communication platforms, such as Discord, are used for communication among participants, including students, tutors, and organisers, providing a space for discussions, announcements, and informal interactions.

Digital collaboration and ideation tools, such as Miro, are used by participants and organizers for brainstorming and ideas sharing and collaborative activities.

Virtual Reality Head Mounted Displays (HMDs) are used for experiencing interactive VR projects and 360 movies.

Augmented Reality technologies, such as the Vuforia engine are used for developing AR experiences.

Game Engines, such as the Unity 3D, are used for the development of interactive Virtual Reality (VR) and Augmented Reality (AR) projects.

Mobile technologies & geo-located media, such as smartphones and tablets with GPS, are used for Augmented Reality applications and geo-located sound walks.

Physical computing equipment is used for creating interactive installations. This equipment includes electronic microcontrollers (such as the Arduino board and Bella board), sensors (such as ultrasound sensors, photocells, force-sensing resistors and more), and actuators (such as motors, linear actuators and more).

Audiovisual capturing equipment and studios, used for capturing images, videos and audio. The equipment includes cameras, microphones, 360 cameras, hydrophones and more. The green screen studio is available during the course for capturing videos that can be easily edited during post-production.

Video editing and post-production software, such as DaVinci Resolve, Adobe Premiere and After Effects, is used for editing captured videos.

Sound editing software, such as Audacity and Reaper, is used for editing and composing sound.

Illustration, image editing and digital drawing tools, such as Krita, Photoshop, Illustration and Canva are used for creating visual interaction elements and illustrations and for editing images.

3D scanning tools and applications, such as tablets with LiDAR technology and applications, such as Scaniverse, are used to scan 3D objects and export the scanned 3D models.

3D modelling software, such as Blender, is used to create or edit 3D models.

Radio technologies, such as radio transmitters are used for broadcasting radio programmes.

Renewable energy sources, such as solar panels are used to power digital installations.

Remotely Operated Vehicles (ROV) are remotely operated submersible vehicles used to perform underwater observation and to facilitate capturing of underwater digital content.

Presentation Tools, such as Impress, PowerPoint and Canva are used for creating online presentations.

Generative AI tools, such as ChatGPT and Meshy are used for creating digital content.

Throughout the workshop, tutors with expertise on specific technologies support students on learning new skills and using them in their projects.

Methods

In this section the methods and ways of learning, working and collaborating in the course are described. The Experience Report section addresses how these methods were implemented during the course.

Collaborative Workshops involve group activities and exercises designed to encourage teamwork, idea generation, and shared problem-solving. These workshops likely promoted collaboration among students and tutors.

Design Sprints are time-bound, structured workshops that encourage rapid ideation and prototyping. They are often used to solve complex problems and generate innovative solutions or are employed to guide students in refining their project concepts. Designing, prototyping, and testing ideas with users are typical phases of Design Sprint. See more information here: https://designsprintkit.withgoogle.com

Prototyping is a hands-on method that involves creating tangible representations of ideas. Students are engaged in prototype development to bring their sustainable media formats to life, even if they were not final products.

Future Prototyping is a design methodology that involves creating prototypes of products, services, and anticipating experiences that are not yet available, with the aim of exploring potential future scenarios and identifying new opportunities for innovation.

Speculative Design involves creating design concepts, products, or services that are intended to provoke discussion, debate, and reflection on potential future scenarios, social and cultural issues, and technological developments. Using imagination and critical thinking to explore possible futures it allows questioning and challenging current norms and assumptions. Speculative design is concerned with asking questions and opening up new possibilities involving the use of storytelling, visualisation, and other narrative techniques to create scenarios that are engaging and thought-provoking.

Marine biology research methods – Data capturing. An underwater drone (remote operating vehicle - ROV) equipped with a standard and a 360-degree camera is used for documenting the underwater landscape and life. Action waterproof camera and smart-phone cameras can be used for some additional footage. For documenting marine life, a mini sediment sampling can be conducted on the beach. Research tools such as corers and sieves are used.

Marine biology research methods – Observation in the Lab. Samples of marine organisms are brought to the lab and can be observed under a magnifying lamp or under a stereoscope. Footage from the magnified organisms can be captured through smart-phones and web-cameras.

Cross-Cultural Collaboration among students from different countries and cultural backgrounds can be considered a method in itself. The diverse composition of teams likely encouraged cross-cultural learning and the exchange of ideas.

Expert presentations involve inviting professionals or subject matter experts to share their knowledge and insights with participants. In the context of the camp, experts likely presented on topics such as climate change, data visualisation, and storytelling.

Storytelling techniques, such as narrative development and storytelling frameworks, help students craft compelling narratives for their projects. Preparation of narrative content related to mythology, historical facts, environmental data and local information.

Iterative presentation and feedback sessions throughout the course, where students present their work and receive feedback. This iterative process of presenting and refining project concepts is a common method for developing prototypes.

Nature Walks and Ideation Walks are experiential learning activities that involve exploring natural environments. These walks are likely used to connect participants with nature, stimulate creativity, and inspire sustainable project ideas. They are opportunities for students to (re)connect to nature. They can be used to allow nature-based inspiration based on different mindfulness instructions as well as guidelines to document the walk by representations of such as drawings, photos, videos, 3D photography and small installations to capture natural elements.

Deep listening, a method by Pauline Oliveiros for listening exercises.

Inclusive radio, a method developed by the Out Of the Office Radio platform which sets up the situation and allows people to find their voice through the active making of radio together.

Capturing nature in the digital domain, this method includes capturing of natural elements, through various recording and scanning techniques. The aim of the capturing process is to digitise inspiring natural elements which could be later integrated into digital artworks. Proposed capturing techniques include audio and video recordings, photography, 3D scanning and photogrammetry.

Competencies

The Listen to the Waters course addresses a wide range of competencies, from technical and creative skills, to social and collaborative, as well as sustainability competences, as described by the GreenComp: The European sustainability competence framework[1]. The course's main competences include the following:

- **Knowledge**
  - Augmented reality
  - Locative media
  - Interactive interfaces for artistic projects
  - Radio technologies
  - Low-energy technologies
  - Using renewable energy sources
  - Sustainability concepts, Sustainable Design
  - Biodiversity
  - Working with audio (recording & processing)

- Skills
  - Rapid content & interface prototyping
  - Concept and project planning for (interactive) projects
  - Pitching and reviewing a concept
  - Future skills
- Social Competencies
  - Building a transcultural team
  - Working in an interdisciplinary team
  - Creative processes and decision making
  - Self-reliance and empowerment
  - Self-organisation within teams

- Sustainability Competences
  - Embodying sustainability values
    - Valuing sustainability
    - Supporting fairness
    - Promoting nature
- Embracing complexity in sustainability
  - Systems thinking
  - Critical thinking

[1] https://publications.jrc.ec.europa.eu/repository/handle/JRC128040

    - Problem framing
- Envisioning sustainable futures
    - Futures literacy
    - Adaptability
    - Exploratory thinking
- Acting for sustainability
    - Political agency
    - Collective action
    - Individual initiative

Tentative tasks of teams during course include the following:

- **International Teambuilding and Leadership**
  Students engage in international team-building activities, fostering collaboration and leadership skills. They learn to work effectively with peers from different cultural backgrounds.
- **Research and Ideation based on a briefing**
  Students conduct research on sustainability challenges and use this knowledge to ideate and design their prototypes. This process encourages critical thinking and problem-solving.
- **Concept Development**
- The course includes workshops on concept development, where students refine their ideas and transform them into prototypes.
- **Prototype and test**
  Participants gain hands-on experience in prototyping media formats. They learn how to create prototypes and test their functionality, ensuring that their concepts could be realised effectively.

Curriculum

Objectives

One of the main objectives is to use digital technologies and new media to create narratives and artworks that raise environmental awareness on the topics of biodiversity loss and precarity of global water resources. Another important objective is to teach methods for sustainable digital media production based on reduced energy consumption and renewable energy sources. The third main objective is blending human creativity with nature, by creating artistic experiences respectfully embedded in natural environments. The core competencies are:

- Knowing the basic terminology of sustainability
- Exploring the creative potential of new media technologies
- Ability to ideate and design prototypes based on sustainability values
- Rapid content and project prototyping
- Pitching and reviewing projects and ideas
- Reducing the environmental footprint of digital media production
- Collaborating in an international team.

The full list of competencies that the students can gain on the course, can be seen in the Competencies section.

Content

Preparatory Sessions: The preparatory sessions started with an introduction to the GEM project and the Listen to the Waters course, followed by a definition of key terms and concepts related to the course's topics. The sessions also included a series of lectures by experts on Interactive Art in Nature, Land Art, Water Biodiversity, Low energy devices and renewable energy sources for outdoor installations, Radio technologies & the Out of Office Radio Project, Sound Art in nature, Augmented Reality & geolocated art in nature and public spaces. Lastly, during the preparatory sessions practical info was shared regarding the participation at the onsite course.

Listen to the Waters main course: The main course started with an introduction of participants, teambuilding activities and inspirational discussion, followed by the introduction of the challenge and brainstorming. The main activities of the course included walks and visits at natural locations, co-creation sessions, ideation and design sessions, development of prototypes, as well as feedback and refining of prototypes. The course concluded with the presentations of the results from the six groups: Interactive art in nature, Augmenting Nature: AR walks in natural ecosystems, Radio Water (Biodiversity), Radio Fire (Biodiversity), Art for Futures Lab: Site-specific Ritual Theatre Performances, Water ecosystems: investigating the essence and the information that water carries.

Prerequisites

Basic knowledge of working on digital productions and using digital creative tools is recommended. Additional knowledge of some of the specific media and technologies used in the course (e.g., VR, AR, radio, physical computing, 3D scanning, etc.) is welcomed.

Evaluation

Evaluation will be based on tutors' and students' feedback, provided through surveys, experience reports and observations. The evaluation will take into account the results of the students' work developed during the course, i.e. the new media prototypes and artworks. Apart from the final outcomes, the evaluation will take into consideration the background knowledge of students, their overall work during the course, their participation and involvement in the process. Finally, the overall collaboration and work conducted during the online pre-course and the onsite main course should be part of the evaluation.

EXPERIENCE REPORT

The experience report explicitly addresses how the course was implemented, i.e. what happened when the above plan was put into practice. This section is based on the experience reports written by the tutors of the six groups, included in the Appendix.

Course Overview & Activities

Preparatory Workshops (pre-course)

The Listen to the Waters course started with a series of four weekly online preparatory sessions. The sessions took place every Wednesday of May, 2025. These sessions included lectures from experts on specific topics related to the course's concepts. The main objective of the pre-course was to introduce participants to the main concepts and terminology of sustainability and biodiversity. Moreover, the pre-course aimed to familiarize participants with specific media and technologies that would be later used during the main course. During the first session of the pre-course Workshop 1 (May 7th) an introduction of the GEM project and the Listen to the Waters course took place. Tutors and students introduced themselves and tutors presented the course's concept, objectives, structure and content. Then prof. Dimitris Charitos (NKUA) gave a lecture on Land Art and asst. prof. Alexandros Kontogeorgakopoulos (NKUA) gave a lecture on Interactive Art in Nature, showcasing a series of indicative artworks. During Workshop 2 (May 14th), asst. prof. Nafsika Papageorgiou (NKUA) gave a lecture on Water Biodiversity and asst. prof. Eleftherios Tsampasis (NKUA) gave a lecture on sustainable solutions for outdoor installations, presenting low energy devices and renewable energy sources. On Workshop 3 (May 21st), artist and lecturer James Prevett introduced participants to Radio technologies and presented the Out of Office Radio Project. On the second part of the workshop, asst. prof. Orestis Karamanlis (NKUA) gave a lecture on Sound Art in nature. During the last session of the pre-course Workshop 4 (May 28th) asst. prof. Caterina Antonopoulou, asst. prof. Charalampos Rizopoulos and adj. lecturer dr. Iouliani Theona (NKUA) gave a lecture on Augmented Reality & Geo-Located Art in Nature and Public Spaces. During the second part of the session, tutors of all six groups briefly presented the concepts, content, media and technologies that they will use during the main workshop and students were asked to choose the group that they would like to join. Practical information regarding participants' arrival and stay on Evia Island was shared by the organizers.

Listen to the Waters: Water and Biodiversity main course

The main course The Listen to the Waters: Water and Biodiversity took place from June 1st to June 6th, 2025, on Evia Island in Greece. During the first day (June 1st) the organizers welcomed the participants at Politika, on Evia Island. They spent the evening together, discussing and getting to know each other and had dinner at local restaurants. The second day (June 2nd) started at the Evripos Campus of the National and Kapodistrian University of Athens, located at the Psachna town on Evia Island. The organizers of the course presented the course content and schedule in more details and guided the participants to the studios and labs of the campus that were available for use during the course. Then students and tutors split to their corresponding teams. Team members introduced themselves to each other and introduced their particular skill and experience backgrounds. The tutors presented the main activity, which was the design and development of a project prototype. Each team tutors gave specific guidelines for their team and students started brainstorming and sharing ideas. Some teams applied specific methods like deep listening exercises, that included listening to the surroundings moving between global sound and focal sounds, a Silent Walk aiming to sensory connection with nature, knowledge-sharing on Greek mythology, and research on the island's history and current, site-specific environmental challenges. Tutors also presented the available equipment that students could use during the workshop. After having brunch, workshop participants visited natural locations on Evia Island by bus, following the route of water on the island: from the mountain springs to the river and the waterfalls, and finally to the sea. More specifically, participants visited the Agali Gorge and walked part of the trail which ends up to Dirfis mountain. Then they visited the location of Agia Kiriaki, a place with water springs and waterfalls. Finally, they arrived at the beach of Politika. During these nature walks, students were encouraged to record videos and audio, to take photos, to scan objects and to gather small artefacts to inspire the creation process. Students of some groups combined the excursion with the task of finding a suitable place for installing and presenting their project.

During the 3rd day (June 3rd) teams collaboratively worked on ideation, sketching, exploration of design options and co-creation of their project prototypes. Most teams defined sub-tasks and distributed the work according to each participant's skills and background. Some teams started producing assets that would be needed for the project such as sound and video recordings, and 3D scans. Each team applied different methods. For example, a team worked with the biodiversity experts. They visited different locations and applied sampling methods for marine biology research in order to gather the needed information for the project. Later the same team visited the "Biodiversity and Ecosystem Services" Laboratory in the campus, where the students had the opportunity to examine and experiment with the samples they collected during the field trip. Another team used the methods of Impro Theatre to experiment with sounding and singing, they organized a Design sprint on final ideas to reach joint conclusions and got engaged in co-creation labs for performance to define the basic concept for rituals, characters, media, and location. During the afternoon some teams visited the location of Dafni beach to continue the ideation, the creation of digital assets, the selection of natural artefacts and the selection of the most appropriate location for the presentation of their final project. During the fourth day (June 4th) all teams worked on the development of their prototypes.

The tasks undertaken included building electronic circuits using the arduino microcontroller, sensors, recording voices and sounds, editing sounds and videos, developing an Augmented Reality application using the Unity Game Engine and the Vuforia engine, creating AR image targets, video recording at the green-screen studio, video post-production, live radio broadcasts, interviewing locals, organizing radio programmes, collecting nature-based props and costumes, creating site-specific artworks, developing scripts for performers, co-creating performance elements, editing 360 video and composing original audio. Throughout the co-creation process students tested their prototypes, discussed their progress with tutors and refined their projects. Tutors also supported students and helped them with using more specific equipment or software.
During the morning of the fifth day (June 5th) participants worked on the refining of their prototypes and the preparation for the presentations. Each team worked on the selected location in order to install the project for the evening presentations. During the evening all teams presented the results of their work and received feedback. Firstly, participants visited the Agali gorge where Group 1 presented an interactive installation, Group 2 presented an Augmented Reality Walk around the campus, Group 3 and 4 presented a live radio programme, Group 5 presented a site-specific ritual theater and media

performance, and Group 6 presented a cinematic VR piece and a short movie. More details and photos of the projects can be found at the 'Results of Student Works' section.

The last day of the course (June 6th) was more relaxed. Participants were asked to provide feedback on their experience of the course. They also shared impressions and thoughts. Participants left Political and travelled towards the Athens airport.

Competencies

Tutors and students substantially expanded their understanding of sustainability and biodiversity during the course. The contribution of experts on the fields of biodiversity and renewable energy was important for achieving this broadening of knowledge, in both a theoretical and practical level. More concretely, apart from a theoretical lecture on Marine Biodiversity during the pre-course, participants had the chance to apply marine biology research methods in practice during the course. They used an underwater drone (Remote Operating Vehicle - ROV) equipped with a 360-degree camera to document the underwater landscape and life. They also conducted a mini sediment sampling on the beach, to document marine life. Research tools such as corners and sieves were used. Students also had the chance to visit the "Biodiversity and Ecosystem Services" Laboratory and to observe the organisms that they collected under a magnifying lamp and a stereoscope.
Similarly, apart from a lecture on sustainable solutions for outdoor installations during the pre-course, students had the chance to use low-energy devices and renewable energy sources, during the course. More concretely, students used microcontrollers to control sensors and a mobile solar power unit to power the devices required for their outdoor interactive installation.
Moreover, students learnt a lot about these topics, through the research work they conducted while designing and implementing their prototypes.

Additionally, the curriculum featured expert sessions providing specialised knowledge on new media and creative technologies, including AR, VR, geolocated media, radio technologies, interactive installations with sensors, actuators and microcontrollers, sound art and more. Under the guidance of tutors, students had the opportunity to use equipment, software and technologies, such as 3D scanners, VR headsets, mobile devices running AR apps, Game Engines, Physical computing equipment, 360 cameras, hydrophones, Remote Operating Vehicles (ROVs), solar panels, radio technologies, and more. For some students, it was the first time that they had the chance to use these technologies. As noted by a student:

> *"[I liked] All the activities during the workshops [...] Everything was actually new to me and I love learning about new topics and different fields, so this experience was really rewarding to me."*

It is noteworthy that the camp was not solely a transformative experience for students. Tutors also reported significant professional growth. Through the discussion and the exchange with colleagues from different professional fields they had the chance to get novel perspectives. As noted by two different tutors:

> *"The most important aspect of the workshop to me was the fact that we were introduced to some methodologies of marine biology research in practice"*
> *and*

"I was very interested in the 'art and science' aspect of this project, and the possibilities of fusing biology with digital art."

The course provided a unique opportunity for enhancing international collaboration. During the camp, students were strategically assembled into international and interdisciplinary teams. Interdisciplinarity fostered collaboration, as students had to combine complementary skills to fulfil tasks and collectively develop their projects. Mutual learning and knowledge exchange was prevalent throughout the course. Collaborative engagement in extra-curriculum activities contributed to the development of essential 'soft skills'.
Finally, the camp served as a catalyst for transformative learning, catalysing a comprehensive re-evaluation of the intricate relationships between nature, technology, humans, blending the realms of art, science and media production.

Instructional Materials

The instructional materials of the Listen to the Waters course consisted of a curated set of resources to facilitate a multifaceted learning experience. All teaching and information materials are shared with participants and part of the materials are made publicly available on the GEM website. These materials include:

Listen to the Waters': Water and Biodiversity Course

Introduction to the Green Education in Media (GEM) project and the 'Listen to the Waters': Water and Biodiversity course. Presentation of the course's concept, location, hosting department, schedule, challenge, media and technologies to be used and the sub-themes of each group.

Land Art, Environmental Art: art with and for the environment

An overview of the movements of Land Art and Environmental Art that focused on creating art with and for the environment, and a showcase of prominent artists and indicative artworks.

Interactive Art in Nature

An introduction on the synergies of art, science and technology and a compilation of interactive art projects in natural locations.

Marine Biodiversity

An introduction to key concepts and definition of terms, such as Ecology and Biodiversity, a discussion on the relation of Ecology and Biodiversity, an overview of aquatic ecosystems and marine biodiversity, Organisms living in diverse aquatic ecosystems, presentation of equipment used for documenting marine ecosystems.

Art Meets Sustainability: -Low energy devices and renewable energy sources for outdoor installations

A presentation of the challenges and solutions for powering outdoor art installations, in a sustainable way. Presentation of two main renewable energy sources for artists: solar energy and wind energy. Overview of various types of low energy devices and best practices for integrating them in artistic projects.

Augmented Reality & Geo-Located Art in Nature and Public Spaces

Definition of Augmented Reality and Geo-Located Art. Technologies and methods of using AR and geolocation on artistic projects. An overview of artistic projects that use Augmented Reality and geolocation in nature or public spaces.
Tutors of each team shared more learning resources with their team members. The video recordings of all pre-course sessions were also made available to participants.

Course Technology

The Listen to the Waters course used a wide range of technologies to support the design and development of the students' prototypes, and to facilitate the overall learning experience, communication and collaboration. During the pre-course, the Zoom video conferencing platform was used for the online lectures and the communication between participants. The cloud storage platform Google Drive was used for sharing resources, during both the pre-course and the main course. The Discord platform was used for communication between students, tutors, and organisers. A dedicated discord channel was created for the course and separate sub-channels were used for each team. Discord provided a space for discussions, announcements, and informal interactions. Miro was used by some teams for ideation and collaborative activities.
The Unity 3D Game Engine and the Vuforia Engine were used for the development of an Augmented Reality (AR) application. The AR application was later uploaded and tested on mobile devices (smartphones and tablets). Two Virtual Reality Head Mounted Displays (HMDs) were used to experience a cinematic VR piece. Physical computing equipment was used for creating an interactive installation. More specifically, students used the Arduino microcontroller with an ultrasound sensor, and they built electronic circuits using various electronic components. For capturing video, students used video cameras and 360 cameras, and for capturing audio the used microphones and hydrophones (underwater microphones). For processing the captured videos students used various video editing and post-production software, such as DaVinci Resolve, Adobe Premiere and After Effects. They also used sound editing software, such as Audacity and Reaper to edit and compose sound. Krita, Illustration and Canva were used for creating 2D visual elements and illustrations used as AR image targets. Students used iPads with LiDAR technology and the Scaniverse app to scan 3D objects and export the scanned 3D models in fbx format. They also used Blender for 3D modelling and for processing scanned models. Radio technologies were used for broadcasting radio programmes. More specifically, students used the Out of Office (OOO) Radio, which is a mobile radio station, consisting of a battery powered broadcast platform and set of tools that allowed students to broadcast from various natural locations. A mobile solar power unit was used to power an interactive installation in nature. An underwater drone (Remotely Operated Vehicle - ROV) was used to document underwater marine ecosystems. Finally Impress, PowerPoint and Canva were used for creating the final presentations and ChatGPT was used for curating texts and searching info.
Students had also access to four labs of the Digital Arts and Cinema department of the National & Kapositrian University of Athens: The Digital Arts Laboratory, the Digital Multimedia Technology Laboratory, the Digital Film Direction Laboratory, and the Sound Lab. There they could use computers and specialized software, as well as the green screen studio. They also had access to the Biodiversity and Ecosystem Services Laboratory of the Department of Agriculture Development, Agri-Food and Natural Resources Management of the University of Athens. There they had the opportunity to use the lab's scientific equipment, under the supervision of their tutors.

Learner Support & Interaction

Learner support was of key importance throughout the Listen to the Waters course aiming to create a supportive and inclusive learning environment.

Support for learners began even before the main course. The online sessions of the pre-course introduced participants to key concepts, terminology, and digital tools they would use. This early engagement ensured that all students—regardless of their prior experience—entered the course with a shared understanding of essential topics and technology. The pre-course phase also included expert-led sessions covering areas such as marine biodiversity and sustainability. These sessions enriched students' knowledge and offered valuable perspectives, setting a strong foundation for deeper learning. Expert involvement in this stage greatly enhanced the overall educational experience. In addition to academic support, learners received support on practical issues regarding their trip to Evia Island. Assistance was readily available from organisers, who answered questions and provided access to the necessary resources.

During the main course, participants were divided into groups, each guided by dedicated tutors who offered support to team members. These tutors supported students with group tasks, helping them access resources and effectively organize collaborative work. Support was also essential when it came to using new technology. Some students were unfamiliar with the equipment and software involved, so expert help was crucial to ensure they could effectively use the tools provided. Learner support extended to the formation of groups. Interdisciplinary and cross-cultural groups were intentionally formed to enhance the learning environment. These diverse teams encouraged the exchange of different perspectives and helped build a sense of community and collective learning. Beyond academic learning, learner support also focused on the development of soft skills. Students were encouraged to work together in a non-hierarchical way, which promoted teamwork and improved communication.

The course also included peer learning and feedback opportunities. Participants regularly shared their ideas, prototypes, and progress with one another, receiving constructive feedback that helped improve the quality of their work and stimulated critical thinking. Learner support throughout the course was tailored to individual needs. Recognising that each participant had unique skills and interests, the course offered personalised guidance that allowed everyone to progress at their own pace within the wider context of the course.

In conclusion, learner support within the course was a multifaceted and comprehensive endeavour aimed at facilitating the overall experience of participants. It encompassed not only academic guidance but also the cultivation of essential interpersonal and cross-cultural skills.

Interaction between participants took several forms during the online pre-course and the onsite main course. During the online pre-course activities, learners and tutors interacted via the Zoom video conferencing tool. The Discord platform was also used to facilitate interaction among participants throughout the course. During the onsite workshop, learners and tutors interacted effortlessly and naturally. Students participated in vibrant conversations and showed enthusiasm during the co-creation sessions. The interactions expanded beyond working hours into extracurricular activities.

Evaluation

The evaluation of the Listen to Waters course was based on the feedback of students and tutors. After the conclusion of the course, students were asked to participate in an online survey. The survey consisted of 21 questions, including 4 multiple choice questions, 8 scale questions and 8 open free-text questions, which allowed participants to elaborate on their answers to scale questions or to share their experience of the course. The student's survey included questions, such as:'What did you expect to be taught and learn in this course?', 'How were your expectations regarding the teaching and learning content met during the course?', 'What unexpected insights or lessons did you learn from the course/workshop?' 'How would you rate your learning experience?', 'How did you experience the pace and timing of the online courses?', 'How did you experience the pace and timing of the onsite workshop?'. 'How did you perceive the course organisation?', 'What did you particularly like?', 'What didn't you like so much?' and more.
Tutors were asked to write experience reports directly after the course. The experience reports included questions on the difficulties and challenges that they faced, on things that surprised them in a positive way, on things they learned, as well as recommendations and suggestions for improvements for future iterations of the workshop. Moreover, during a post-course meeting, tutors discussed their experience, shared thoughts and noted down their observations on post-its, answering questions regarding the negative and positive aspects of the experience, such as 'What went well?', 'What could go better?', 'What ideas do you have for future work and what opportunities are there for improvement', 'How should we take action? Specific things we should change?'. Observations made by educators and assessment of final projects were also taken into account for the evaluation of the course. Further results of the evaluation and conclusions drawn from tutors and students' feedback can be reached at the "GEM – Course Evaluation[2]" document.

Results of Student Works

Group 1: Interactive art in nature
Group 1 created an interactive audiovisual artistic installation in the gorge of Agali, using physical computing (microcontrollers, sensors, actuators). The artwork was installed in a specific route in the gorge and consisted of sic Points of Experience of "Mama nature" (POEMs). The POEMs were as follows:

- A water source to fill your bottle and carry water up the dried-out stream.
- A multi-source audio ambient sound and smartphone-drop station, in order to disconnect from civilization and reconnect to nature.
- A mix of recorded voices describing water, stone and a further element of individual choice in all languages present at the camp. Translating nature elements between understanding and feeling.
- A projection inside a larger tree hole, symbolizing the "womb" of nature that soothes and protects us.
- A water basin in a tree root to give back the water to mother nature and revitalize the circle of life, combined with a proximity sensor that would play an amplified sound to give an amplified feedback and feeling of gratification for the act of giving water. This was the final POEM.

[2] https://gem-project.eu/wp/wp-content/uploads/2025/10/GEM_CourseEvaluation_Listen-to-the-waters.pdf

Group 2: Augmenting Nature. AR walks in natural ecosystems
Group 2 created an Augmented Reality (AR) application, running on mobile phones and tablets. Users of the application followed a specific trajectory in nature (AR walk), where they encountered specific AR markers, which triggered digital content. The concept of the project is a reflection on the scarcity of natural water supplies. The scenario has a main character, a nymph, who wants to help humanity to regain natural water resources. In order to do so, she asks users to help her break a curse by answering five questions. AR walk contains five points with AR markers. Each of the markers triggers a video and some 3D models, through the AR application. In the video the nymph gives some info to the users and then she asks a question. Users have to write down their answers on a paper sheet in order to discover the answer to the last question (which emerges from the previous answers) and fulfil their mission of breaking the curse

Group 3: Radio Water (Bio-Diversity) & Group 4: Radio Fire (Bio-Diversity)
Group 3 & Group 4 collaborated in producing and broadcasting a joined radio programme using the Out of the Office (OOO) radio platform. The radio programme included: A live show host and quiz with specially made jingles and a fake advert, a 30-minute pre-recorded interview with a local farmer about the fires and floods and changing ecology, a live radio play with foley sound effects involving 6 people, an experimental sound work, a 1 hr set of interviews with other students about the differing cultures of water and sea.

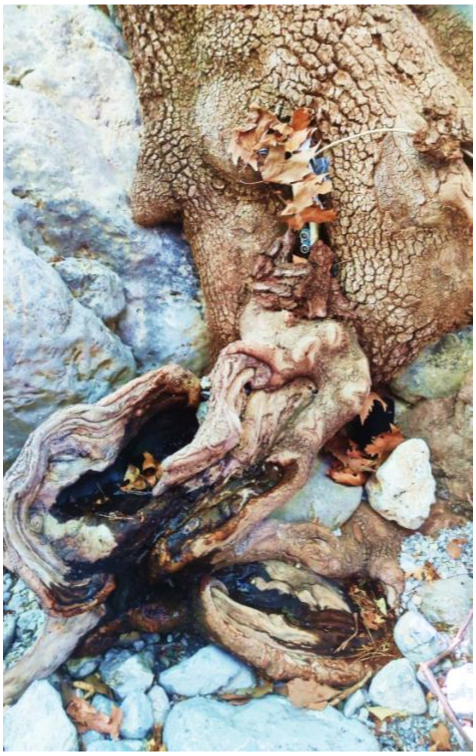
Group 5: Art for Futures Lab, Site-specific Ritual Theatre Performance/s
Group 5 created with 7 students a site-specific ritual theatre performance as part of their Art for Futures Lab. The process began with research and sense-making on local environmental challenges—incl. forest fires, flooding, and contaminated water—through sensing exercises, sound recording, and historical exploration of the site. As part of their artistic inquiry, the group engaged in free singing sessions, which were recorded and later integrated into a multi-layered sound installation. Through filming, audio composition, and role development, they crafted an immersive media-based ritual experience. The final performance invited participants to begin their journey by selecting a stone from the beach, used as a personal anchor throughout the ritual. Guided individually through a 7 minute- sequence of symbolic encounters, participants experienced a narrative of letting go, purification, and future-oriented reflection, blending myth, embodiment, and sound into a deeply personal passage.

Group 6: Water ecosystems. investigating the essence and the information that water carries
Group 6 created a cinematic VR piece and an audiovisual piece that could function as a standalone artistic installation. Their aim was to highlight the fundamental importance of water for the existence and future of humanity and to emphasize how much remains unknown about the underwater world. The two pieces emerged from a poetic interpretation of the documentation of underwater marine life that they earlier made. For the documentation they used an underwater Remotely Operated Vehicle (ROV), hydrophones (underwater microphones), video from the underwater camera of the ROV and finally 360 VR panoramic video which was recorded with a camera that was rigged on the ROV.

Sample results of student works

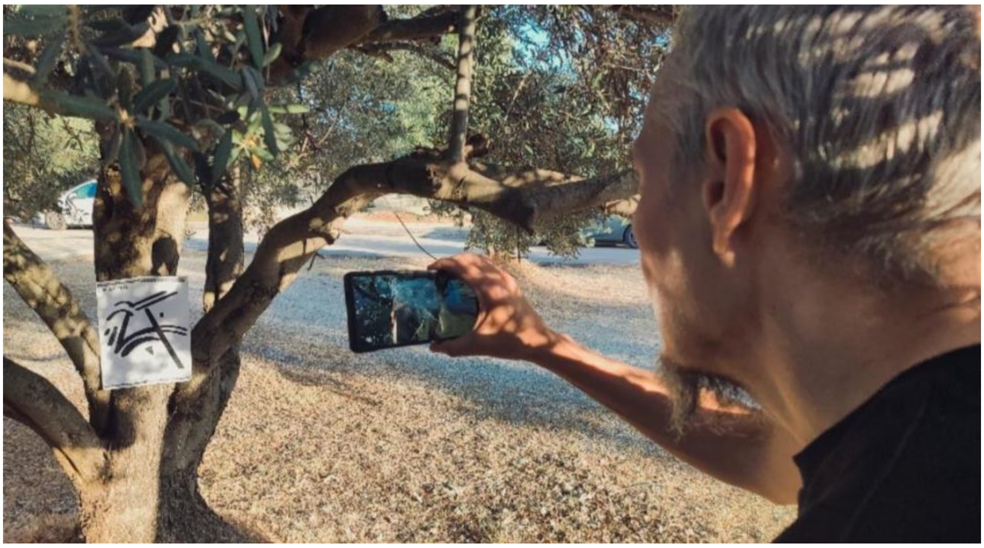
Group 1

Group 1: Interactive installation (Location: Agali gorge, Evia Island) © Caterina Antonopoulou



Group 1: Interactive installation (Location: Agali gorge, Evia Island) © Caterina Antonopoulou (left photo) & Pascal_Lehmann (right photo)

Group 2


Group 2: AR walk (Location: Evripos Campus of NKUA, Evia Island) © Caterina Antonopoulou



Group 2: AR walk (Location: Evripos Campus of NKUA, Evia Island) © Caterina Antonopoulou


Group 2: AR walk on map

Group 3 & Group 4

Group 3&4: Radio Broadcasting (Location: Evripos Campus of NKUA, Evia Island) © Caterina Antonopoulou

Group 3&4: Radio Broadcasting (Location: Evripos Campus of NKUA, Evia Island) © Pascal_Lehmann

Group 5




Group 5: Site-specific Ritual Performance (Location: Evripos Campus of NKUA, Evia Island) © Pascal_Lehmann

Group 6


Group 6: **Nafsika Papageorgiou** (left) is an assistant professor on Biodiversity at the Department of Agriculture Development, Agri-Food and Natural Resources Management of the University of Athens. She is observing organisms collected earlier by students of group 6. | Dr. **Panagiotis Dimitriou** (right) is a post-doctoral researcher on Marine Biology at the University of Crete. He helped group 6 to drive an underwater drone and collect data from the sea. (Location: Evripos Campus of NKUA, Evia Island) © Caterina Antonopoulou

Group 6: Cinematic VR (Location: Evripos Campus of NKUA, Evia Island) © Pascal_Lehmann

Group 6: Audiovisual piece(Location: Evripos Campus of NKUA, Evia Island) © Pascal_Lehmann

Recommendations

The interesting results of the Listen to the Waters course highlight the importance of integrating sustainability modules into higher education curricula. The imbuement of sustainability concepts to digital arts and media production students can have a beneficial impact on their future professional work. Moreover, the course could serve as a blueprint for partner universities and other educational institutions that seek to engage students in sustainability-focused initiatives.

The incorporation of a wide range of new technologies to the Listen to the Waters course contributed to the quality of final results and was accepted positively by students. These technologies (including VR, AR, Physical Computing, 3D scanning, 360 video and more) reportedly broadened students' knowledge and skillsets. At the same time the use of such a wide range of new technologies was challenging. Many students were unfamiliar with these technologies which added an extra burden to tutors and was sometimes time-consuming. A prior familiarization of students with the applied technologies was recommended by some tutors.

Interdisciplinarity played a key role to the success of the course. The contribution of biology and biodiversity scientists was invaluable and gave new perspectives to the course. Both students and tutors praised this contribution and some tutors recommended extending this kind of collaboration in future workshops. This exchange of perspectives seemed valuable for the scientists as well. As noted by one of the biodiversity experts:

> *"The collaboration with the digital arts department gave me several new ideas on how to transfer scientific knowledge to the general public. I believe that VR based experience can be used as a tool for this but also for raising public awareness on sustainability issues."*

Regarding the duration of the course, despite the short timeframe, students managed to deliver noteworthy project prototypes. However, some tutors recommended extending the course by one more day to provide extra time to work on the projects. Moreover, some tutors found the schedule very tight and observed that more time should be dedicated to the final presentations.

Finally, the core idea of creating works from/in/for nature was successfully put in practice. Teams worked in nature throughout the course, during ideation, production and presentation of projects. As noted by a tutor:

> *"The ideation was done with offline tools and in large parts in nature. It showed the power of creative processes as 'brain software', when it does not get interrupted by digital tools."*

Some tutors also recommended having a day without smartphones to prevent distraction from digital technologies.

Students worked in nature, respectfully captured content from it and respectfully augmented nature by installing their artworks in selected natural locations. As noted by a tutor:

> *"It is possible to gently enhance nature instead of 'overwriting' it with digital media and artificial meaning."*

APPENDIX

Course description for participants

GEM – Green Education in Media / Course 2025

Course Theme:

'Listen to the waters': Water and Biodiversity

Reducing energy consumption - Augmenting human perception

As part of the GEM Erasmus+ Cooperation Partnership Project, the third course will take place at the Evripos Campus of the National and Kapodistrian University of Athens located on Evia Island, Greece. The course will focus on the following themes:

- biodiversity in relation to aquatic ecosystems and natural water resources
- digital art within natural settings
- diverse media and technologies, with emphasis on sound and radio
- reducing energy consumption for digital art production and presentation

To support the above-mentioned themes, students will be introduced to the essentials on Augmented Reality (AR), Interactive Art, Sound and Radio Art during the pre-workshop presentations as well as during the workshop.

The schedule of the course is outlined below:

7.05. – 28.05.2025	Preparatory Sessions with weekly online workshops
Meeting-Link: https://filmuniversitaet-de.zoom-x.de/j/61648516721 Meeting-ID: 616 4851 6721	
Estimated total workload for the precourse: 2 ECTS	
7-5-2025 | 16:00 -18:00 (CET)	Workshop 1: - Introduction of the project, course tutors, participants and of the course objectives, structure and content - Interactive Art in Nature: A. Kontogeorgakopoulos, D. Charitos
14-5-2025 | 16:00 -18:00 (CET)	Workshop 2: - Water Biodiversity: N. Papageorgiou - Low energy devices and renewable energy sources for outdoor installations: E. Tsampasis, Y. Dedes
21-5-2025 | 16:00 -18:00 (CET)	Workshop 3: - Introduction to Radio technologies & the Out of Office Radio Project: A. Hadziselimovic, J. Prevett - Sound Art in nature: O. Karamanlis
28-5-2025 | 16:00 -18:00 (CET)	Workshop 4: - Augmented Reality & Geo-Located Art in Nature and Public Spaces: C. Antonopoulou, C. Rizopoulos
01.06. – 06.6.2025 "Listen to the waters" Camp, Evia island (Greece) Estimated Workload: 2 ECTS	
1-6-2025 | evening	Get Together, welcome social event and dinner at local restaurants
2-6-2025 | 10:00-17:30	Inspirational discussion, project work (challenge introduction), commuting to sites in nature, welcome evening.
3-6-2025 | 10:00-17:30	Co-Creation, ideation, sketching, exploring the design options of concepts.
4-6-2025 | 10:00-17:30	Development of prototypes (& radio programmes)
5-6-2025 | 10:00-14:00 15:00 – 19:00 19:00-23:00	Presentation preparation Presentations of camp results from all groups Evening broadcast of radio programmes and Farewell PARTY !!!!!!
6-6-2025 | noon Afternoon-evening:	Departure Curriculum workshop
7-6-2025 | 10:00-12:00	Consortium Meeting: Curriculum workshop

ECTS: The amount of ECTS granted for this course is subject to the individual implementation of the partner universities.

Course Concept
The climate crisis has profound and multifaceted impact on water resources globally, manifested either as water scarcity in some cases, or water excess in others. Global warming leads to prolonged droughts, more frequent and severe heat waves, and more intense wildfires. On the other hand, it accelerates polar ice melting, contributing to rising sea levels and increased flooding at coastal areas. Moreover, higher rates of evaporation, alter precipitation patterns and increase moisture in the atmosphere, leading to more intense rainfalls that cause local floods.

Digital technologies have a significant environmental footprint. Although digital media are largely perceived as immaterial, their operation presupposes a physical infrastructure that consumes natural resources and deteriorates the environment. In this course we will explore how we can reduce the energy consumption of digital media production. We will use digital media in a more sustainable way to create narratives that raise environmental awareness and enhance human perception of global water resources and biodiversity. We will adopt low energy solutions (e.g. microcontrollers) that can be powered by renewable energy sources, such as solar panels.

We will use diverse media and technologies, emphasizing the use of audio by designing sound-based experiences in nature, creating location-based narratives (e.g. sound walks and augmented reality artworks), creating interactive artworks in natural settings, recording audio in nature and using radio technologies (e.g. radio transmitters). Our goal is to enhance human perception of biodiversity. We will focus on species that live in aquatic ecosystems including sea, rivers, and wetlands and try to capture their activity (e.g. using hydrophones to capture underwater sound). We will also explore species that are affected by water scarcity, such as drought resistant plants.

We will investigate methods, practices and techniques for creating new media narratives and experiences on global water resources and biodiversity, that (where possible) will be respectfully embedded within natural environments.

Overview of module
In this module, 9 partner organisations including around 40 students and 20 lecturers will collaborate on creating narratives and experiences on global water resources and biodiversity, using various media, such as locative media, Augmented Reality (AR), audio walks, interactive art installations, audio and radio technologies. We will explore the opportunities of low energy-consumption technologies and audio to create a more sustainable future, on the backdrop of Greek nature and scenery in a multicultural setting. Through a well-balanced division between free time and studying, we aim to create an exciting intercultural learning experience for all participants of the workshop!
Our major topics will focus on Biodiversity and Waters (referring to global water resources and aquatic ecosystems). We will approach these topics using different media emphasizing the use of audio and low energy computing. As a result of this module, we will create new media narratives and experiences related to the course's concept.

During the **first two preparatory workshops** participants will get familiar with the project, its goals and the terminology used in the GEM courses. They will be introduced in interesting case studies, such as interactive artworks in nature. They will be introduced in the concept of Biodiversity. Finally, they will also learn about useful tools, such as low energy devices and renewable energy sources.

In the **following two preparatory workshops** participants will further learn about some of the media and technologies that will be used during the "Listen to the Waters" Camp. More concretely, they will learn about Sound Art and Radio technologies and they will be presented with the Out of Office Radio Project. They will also learn about artistic projects using Augmented Reality (AR) and locative media in nature and public spaces.

Co-funded by the European Union

GEM

In the **“Listen to the Waters” Camp (01.06.25 – 06.06.25)** local groups from Croatia, Germany, Greece, Finland, Malta and Poland will get together in a one-week camp on Evia Island (Greece). There we will have the chance to experience local nature, visit and explore interesting locations on Evia Island. Furthermore, participants will form groups of approx 6-7 students in order to collaborate into one of the course's topics.

GROUPS:

“Listen to the waters” - Water and Biodiversity course structure into groups		
	Theme title	**Tutors**
1	**Interactive art in nature**	Dimitris Charitos, Alexandros Kontogeorgakopoulos, Björn Stockleben
2	**Augmenting Nature: AR walks in natural ecosystems**	Caterina Antonopoulou, Haris Rizopoulos, Malgosia Kotlinska, Monica Hapek
3	**Radio Water (Bio-Diversity)**	Jim Prevett
4	**Radio Fire (Bio-Diversity)**	Adnan Hadzi, Malgosia Kotlinska
5	**Art for Futures Lab, Site-specific Ritual Theatre Performance/s**	Nicole Loeser, Angelica Böhm
6	**Water ecosystems: investigating the essence and the information that water carries**	Nafsika Papageorgiou, Dimitris Delinikolas, Orestis Karamanlis, Dimitris Charitos

Consulting tutors on green energy use: Lefteris Tsampasis, Yannis Dedes

All participants in this module will get a briefing before the preparatory workshops are started.

About the location

The “Listen to the Waters” workshop will take place on Evia Island, at several locations around the Evripos University Campus of the National and Kapodistrian University of Athens, located in Phachna town. Evia is Greece's second-largest island, approximately 1.5 hours driving distance from Athens. The island is located on the eastern coast of Central Greece and is connected to the mainland by two bridges. Evia is a place of natural beauty and diverse landscapes, with a lot of places of interest including beaches, mountains and other natural attractions, archeological and cultural sites, traditional villages and towns.

Evia is strictly connected with the theme of the "Listen to the Waters" workshop. In recent years, the island has been severely impacted by climate change. In August 2021 Northern Evia suffered catastrophic wildfires which destroyed more than 50000 hectares of forest, as a result of prolonged heatwaves and drought. The loss of forest cover increased the risk of soil erosion, flooding, and biodiversity loss and resulted in major post-fire floods. Evia island's unique characteristics make it a perfect location for both critical and creative reflection, as well as recreational and exploratory activities.

Platform and Support

- 1-4 mentors are assigned for each team of approx. 6-7 students
- Work on online whiteboards and video meeting tools during prep workshops
- Communication platform will be used during prep workshops
- Dedicated learning & research materials will be available online
- Prep workshops and camp sessions will be facilitated by an international teaching team

Competencies taught in the Course

Knowledge

- Augmented reality
- Locative media
- Interactive interfaces for artistic projects
- Radio technologies
- Low-energy technologies
- Using renewable energy sources
- Sustainability concepts, Sustainable Design
- Biodiversity
- Working with audio (recording & processing)

Skills

- Rapid content & interface prototyping
- Concept and project planning for (interactive) projects
- Pitching and reviewing a concept
- Future skills

Social Competencies

- Building a transcultural team
- Working in an interdisciplinary team
- Creative processes and decision making
- Self-reliance and empowerment
- Self-organisation within teams

Sustainability Competences

- sustainability values
    - Valuing sustainability
    - Supporting fairness
    - Promoting nature

- Embracing complexity in sustainability
    - Systems thinking
    - Critical thinking
    - Problem framing
- Envisioning sustainable futures
    - Futures literacy
    - Adaptability
    - Exploratory thinking
- Acting for sustainability
    - Political agency
    - Collective action
    - Individual initiative

Tentative tasks of teams during course

- International teambuilding and leadership
- Research and ideate based on a briefing
- Concept development

About GEM
GEM - Green Education in Media is an Erasmus+ Cooperation Partnership between nine international partners (2022 - 2025):

- Film University Babelsberg KONRAD WOLF, Germany (Project Lead) ● Tampere University, Finland
- Tampere University of Applied Sciences, Finland
- National and Kapodistrian University of Athens, Greece
- University of Malta, Malta
- Academy of Dramatic Art, University of Zagreb, Croatia
- Jagiellonian University in Kraków, Poland
- Lodz Film School, Poland
- Institute for Art and Innovation, Germany

Together they are working on:

- Environment and fight against climate change
- Supporting digital and green capabilities of the higher education sector
- Green skills
- Creating new, innovative or joint curricula or courses
- Digital content, technologies and practices

Co-funded by the European Union

The creation of these resources has been(partially) funded by the ERASMUS+ grant program of the European Union under grant no. 2022-1-DE01-KA220-HED-000088645.

Experience Reports by tutors

Group 1 Report- Interactive Sensory Experiences in Nature

Facilitated and report written by **Alex Kontogeorgakopoulos** (Assistant Professor, National & Kapodistrian, University of Athens), **Dimitris Charitos** (Professor, National & Kapodistrian, University of Athens) and **Björn Stockleben** (Professor of Emerging Media Production, Film University Babelsberg KONRAD WOLF).

1) What was the agenda on each day? What did the group do on each day?

At the core of the project was the iterative exploration of places in nature on Evia Island and introduction to interactive concepts and technologies. The general flow of the artistic process could be summarized as "nature inspires art inspires technology inspires art", with the aim of creating an installation that gently enhances our perception of nature with as little intrusion and intervention possible.
The group was comprised of students from 6 universities with diverse experience backgrounds (film production, creative technologies, digital sustainable live/HMI, media management, interactive media arts, digital media arts). Throughout the process the team was highly empathetic, open-minded and constructive, which supported the project very much.

Day 1: Introduction of Team, Ideas and Sites

The team members introduced themselves to each other and introduced their particular skill and experience backgrounds. Alex (teacher) gave a short re-cap of the presentation he gave during the online preparation workshops on interactive art and demonstrates tools. Then the group took a nature walk in the surrounding area, catalysing bi- and multilateral ideation in changing constellations, reflecting where we see a direct or metaphorical role of water in the surroundings. At the end of the morning session, the students were asked to express and collect initial ideas, as well as what they would be curious to try or experiment with in terms of technology.
In the afternoon, an excursion to local water-related sites was combined with the task of finding a suitable place for the installation to be created. The students are encouraged to gather Fotos, videos, audios and small artefacts to further inspire the creation process. Among the places visited were a long, dry gorge (which later became the venue of the installation), a small cascading waterfall with an orthodox chapel next to it, and a beach.

Day 2: Creation

The second day started with a reflection of impressions from Monday's nature exploration. We brainstormed further ideas, noted down and sorted by one group member. The ideas were still on a more abstract level - working with textures of found objects, creation of a scent-dispending device, multi-channel interactive audio, plant-computer interfaces. A notable result of the morning session was the emergence of a common theme of "translating" between the language of nature and the language of humankind, which formed the first common "proto-vision" among the team members. In order to concretise, we asked questions from different angels, e.g. "what would YOU like to do specifically", as partly their very high team spirit worked against them by deferring their individual perspectives in favour of the team vision, neglecting feasibility and implementation aspects in the balance of considerations. The translation process was then detailed as a way back into the "womb" of nature, allowing for artistic metaphors of birth and womb. After the lunchbreak, it was decided to continue the ideation process at a secluded beach, outside of the concrete university building. A key question was still at which location the installation should be realized. At this moment, the teachers left the student alone with the one task to agree on a location. While they were not present during the discussion, it became clear in the aftermath that the students discussed the gorge versus a much more accessible location at the university. It became clear that all artistic considerations favoured the gorge, whereas all implementation considerations pointed towards the university campus. The teachers encouraged the team to choose the gorge and promised to work out the logistics.

Day 3: Experimenting and Assembling

Day 3 saw a short reprise of the discussion about the location, but the team re-assured itself that the gorge was the only artistically sensible decision. In the morning, the Points Of Experience of "Mama nature" (POEMs) were detailed on the basis of a sketch of the gorge and its landmarks. It was decided to stay relatively close to the entry of the gorge, as also other teams would have to present on the same afternoon and as well the equipment would have to be carried along the way. After an hour, all POEMs were defined and the team split up into task-specific subgroups. Material collected during the first two days was consolidated and sorted and further material to be recorded was created. The POEMs were as follows:

- A water source to fill your bottle and carry water up the dried out stream.
- A multi-source audio ambient sound and smartphone-drop station, in order to disconnect from civilization and reconnect to nature.
- A mix of recorded voices describing water, stone and a further element of individual choice in all languages present at the camp. Translating nature elements between understanding and feeling.
- A projection inside a larger tree hole, symbolizing the "womb" of nature that soothes and protects us.
- A water basin in a tree root to give back the water to mother nature and revitalize the circle of life, combined with a proximity sensor that would play an amplified sound to give amplified feedback and feeling of gratification for the act of giving water. This was the final POEM.

The team spent the day fixing arduino sensors, recording voices, mixing pre-recorded sounds and videos, as well as texting. Some experiments were dead ends, especially an attempt to build an interactive mp3-player with arduino, where 4 people after each other tried their luck to find out the add-on device was broken. However, in parallel another team member already worked on a contingency measure. Throughout the process, the teachers provided individual support.

Day 4: Implementation and Presentation

At the beginning of the day, the team reconvened to clarify missing tasks and to refine the POEMs according to findings and work-arounds identified during the third day. After final preparations, the team went to the gorge to have two hours of preparations before the start of the presentation. The team decided to lead the visitors through the dried-out riverbed and used nature materials to nudge them towards the right way. When the other student groups arrived, they were lead to explore the installation in groups of 6 to allow for a more meditative experience. Although strenuous, the work was finished in time for the main group to arrive and received very well.

2) Did you use special methods and if yes, at what point of the process?

- Ideation walk and altered locations for ideation to break deadlocks during the first two days
- "Cardeation" - inspired by a moment when the group had to split up into two cars to go to another place, we introduced the idea of using transfer times in separate groups to give ideation briefings and then the groups would pitch the results to each other to find a synthesis
- Experimental sound and voice recording

3) What difficulties and challenges did you face?

The students shied away from getting to concrete during the first 1,5 days, whereas an oscillation between abstraction levels probably would have brought more clarity earlier in the process.
The experiments on the third day exposed some dead ends, which had cost time.
Choosing the gorge for the final presentation put additional logistic challenges on the group (which were nonetheless solved).

4)What surprised you in a positive way?

The team spirit was excellent; everyone had a positive and pro-active attitude. Also, altering ideation settings was very good to overcome deadlocks. The final artwork was a real symbiosis of many ideas on the way, even some ideas I deemed as lost or dead-ends early in the process re-emerged in a synergetic fashion in the final implementation.

The interdisciplinary nature of the Psachna Campus allowed to approach the electrical engineering department, where one professor offered to support the installation with a mobile solar power unit.

5) What did you learn?

It is possible to gently enhance nature instead of "overwriting" it with digital media and artificial meaning. Also, the ideation was done with offline tools and in large parts in nature. It showed the power of creative processes as "brain software", when it does not get interrupted by digital tools.

6) What would you do differently next time (suggest improvement for future iterations of your workshops)?

We liked the implicit artistic reflection on nature very much, but would next time add one session with a scientist or a similar factual input to increase the depth of knowledge and understanding of nature. On a very practical note - we had three teachers and each one had to be absent now and then. Although there was always a teacher present, this should be made transparent to the students from the start, who is available when, to avoid misunderstandings.

To focus even more on the creative team process, we could introduce a smartphone-free day or smartphone free afternoons.

7) You are welcome to add remarkable things at your own judgement, but keep it short and reduce to the essentials.

Finding the right location or element of nature that inspires the whole group is essential. It would be worthwhile to intensify this process early and build the rest of the ideation on this fundamental decision.

Group 2 Report - Augmenting Nature: AR walks in natural ecosystems

The 2nd group worked under the thematic “Augmenting Nature: AR walks in natural ecosystems” with tutors: Caterina Antonopoulou, Haris Rizopoulos, Malgosia Kotlinska, Monica Hapek, together with Kimmo Ronkainen and Markku Turunen. The group included 7 students from 6 Universities (Film University Babelsberg KONRAD WOLF, Jagiellonian University in Kraków, Lodz Film School, National and Kapodistrian University of Athens (NKUA), Tampere University, University of Malta).

1) What was the agenda on each day? What did the group do on each day?

During the 1st day of the course, we gathered at the University Campus and we started with an introduction of group members and a discussion on the background of each member, their skills and interests. The tutors presented the main activity, which was the design and development of a project prototype. The guidelines for our group were to use Augmented Reality technology to augment the natural environment with digital elements. The concept of the project should align with the main subjects of the course: water and biodiversity. Students started an ideation session, brainstorming on the project’s concept. Each student wrote down 2-3 brief ideas on post-it papers. Then they presented their ideas, and they tried to group similar concepts and identify possible directions for the project. Students and tutors had a brief discussion on the assets that would be possibly necessary for the project (natural elements, digital sounds, videos, 3D scans, etc). Then, all workshop participants visited natural locations on Evia Island, following the route of waters on the island: from the mountain springs to the river and the waterfalls, and finally to the sea. More specifically, we visited the Agali Gorge and walked part of the trail which ends up to Dirfis mountain. Then we visited the location of Agia Kiriaki, a place with water springs and waterfalls. Finally, we arrived at the beach of Politika. During these nature walks, students had the chance to video or sound record, to 3D scan objects and to collect interesting natural elements like stones, wooden branches or seashells.

During the second day, students finalized the concept and the design of the project prototype. They created a scenario by blending elements from ancient history and myths, scientific facts, and fictional narratives. Then, they defined sub-tasks, they distributed the work according to each participant’s skills and background, and they started working on the production of the project. During the evening, we visited Dafni beach, where students continued with video and audio recordings and collected more materials required for the project.

During the third day, students continued with the production of the project. They created or edited the required digital assets: videos, sounds, 3D models, 2D images and texts. They used the required equipment and the green screen studio for the video recording. They created an AR project using the Unity Game Engine. They also created 2D images to use as image targets of the AR app. They selected a specific trajectory (AR walk) in the natural environment at the outdoors of the campus. They also created a quiz with specific questions for the users of the AR application, and they printed a sheet where users could note down their answers. They uploaded the application in mobile devices and tested its functionality.
During the fourth day, students refined the project. They solved technical issues, and they installed the work outdoors, by placing AR markers at specific points of the AR walk.
They also prepared a presentation and documentation of the project. They presented the concept, the design and the production process of their project and then they guided groups of viewers, and demonstrated the functionality of the app.
The final result of group 2 was an Augmented Reality application, running on mobile phones and tablets. Users of the application followed a specific trajectory in nature (AR walk), where they encounter specific AR markers, which triggered digital content. The concept of the project is a reflection on the scarcity of natural water supplies. The scenario has a main character, a nymph, who wants to help humanity to regain natural water resources. In order to do so, she asks users to help her break a curse by answering 5 questions. AR walk contains five points with AR markers. Each of the markers triggers a video and some 3D models, through the AR application. In the video the nymph gives some info to the users and then she asks a question. Users have to

write down their answers on a paper sheet in order to discover the answer to the last question (which emerges from the previous answers) and fulfil their mission of breaking the curse.

2) Did you use special methods and if yes, at what point of the process?
During the course we applied unstructured nature walks and rapid prototyping as a way to validate design ideas and functionality early in the project ‘s development. Then we followed an iterative approach, refining the app in each iteration.

3) What difficulties and challenges did you face?
Students had varying backgrounds which was both promising and challenging. The challenge was to find a balance between different perspectives. For example, art students proposed an artistic approach, while media production and management students opted for a more educational and informational application. It was a challenge to create a project which includes all perspectives, especially in such short time limit. Moreover, most of the students weren’t familiar with the technologies used in the group (e.g. AR technologies, 3D scanning, etc), and subsequently a lot of support by the tutors was required.

4)What surprised you in a positive way?
However, despite difficulties, students managed to complete and deliver a working project prototype, in a short time limit. It was inspiring to see how many interesting ideas can emerge from an interdisciplinary group of students.

5) What did you learn?
It was interesting to exchange ideas with students and tutors from varying backgrounds and cultural contexts. Reflections on the relationship between nature and technology are relevant for both students and the tutors, and they can bring new insights about applying sustainable methods to various fields of media production. We also learned a lot about biodiversity and aquatic ecosystems from the biodiversity experts involved in the project.

6) What would you do differently next time (suggest improvement for future iterations of your workshops)?
The involvement of scientists on fields related to specific thematic areas can bring an added value to similar courses and such possibilities should be considered in the design of future courses.

Group 3 & 4 Report - Radio: Water and Fire

Tutors: James Prevett / Adnan Hadzi. Report written by James Prevett

1) What was the agenda on each day? What did the group do on each day?

Day 1
Agenda: To meet, get to know each other, introduce the radio, introduce listening as a method, introduce the equipment and listen to ideas of what we wanted to do for the workshop.

- Everybody introduced themselves
- We moved outside under the trees and I led a deep listening exercise for 30 mins, beginning with grounding ourselves, then listening to our surrounding moving between global sound (everything in the environment that is sounding) and focal sounds (a specific sound in that environment).
- We set up the radio outside, briefly introduced the equipment and how it works
- We made a 45 min broadcast discussing our ideas of what we might like to do to make radio.
- We followed the whole group trip in the afternoon and made some recordings.

Day 2. Agenda: To develop the ideas and what we were going to make together.

- The had a group chat about ideas,
- We divided into interest groups: experimental sound, live radio play with foley, hosts and jingles and interviews.
- We developed ideas in small groups
- We experimented with sounds - foley, recording techniques
- We gathered sounds

We arrived a little late on Tuesday and went straight into the discussion. In retrospect it would have been good to start with a listening exercise on this day.

Day 3. Agenda: To record and make and prepare sound for the final broadcast on Thursday and to make several live broadcasts together on the beach.

- We started with a deep listening exercise live on radio
- We collectively listened to all the sounds we had gathered
- We broke into our groups and developed our ideas based on what we had listened to and what gaps we thought there were
- We had an update on what a rough schedule might look like
- I made three broadcasts on the beach outside the hotel- one at dawn(06:00), one at the hottest part of the day (15:30) and one at sunset (20:30). The students were invited to help with all of them and they joined for the second two.
- We split into groups to gather all the sounds we needed- one group gathered sounds for the live play, one gathered their experimental sounds and one went to interview a local farmer about the fires and floods in the local area.

This was a great day. We collectively made radio on the beach and it was really fun. I wish we had done more broadcasting like this and including other people from other groups. It was very interactive and involving and most of the students participated.

Day 4. Agenda: To complete the sounds and make a final live radio broadcast together.

- We worked intensively to finish our audio
- We set up the equipment

- We made our broadcasts together from 19:30-21:00 that included: A live show host and quiz with specially made jingles and a fake advert, a 30-minute pre-recorded interview with a local farmer about the fires and floods and changing ecology, a live radio play with foley sound effects involving 6 people, an experimental sound work, a 1 hr set of interviews with other students about the differing cultures of water and sea.

We had great fun making the live broadcasts but I think the students felt that nobody paid attention as we were last and everybody was tired and hungry.

2) Did you use special methods and if yes, at what point of the process?
I used a method of deep listening as taught by Pauline Oliveiros for the listening exercises on day 1 and day 3. I also used methods of inclusive radio as developed through our own OOO Radio platform for the broadcast- the method sets up the situation and allows people to find their voice through the active making of radio together.

3) What difficulties and challenges did you face?
I think the location on the campus was not so good for us and as an invited tutor I didn't always get the information. Adnan was sick for part of it which added extra burden on me to make the radio with 12 students.

4)What surprised you in a positive way?
I was surprised how open everybody was- I think everybody took part in the live broadcast on the first day and experienced their own 'radio voice'. I was surprised at how active everybody was in the making and how everybody took part and made something for the radio broadcasts. It was really interesting.

5)What did you learn?

I learned that we can make radio anywhere- even on the beach. I learnt to trust my instincts. I learnt that it is important to start with a grounding exercise (such as the deep listening) even if some found it difficult or awkward. It set the tone for the day.

6) What would you do differently next time (suggest improvement for future iterations of your workshops)?

I think the scheduling was tight. It could have done with ½ or a whole extra day. The final day was way too tight and the visit to the gorge was too much in my opinion for us to fit in.
If we did it again, we would make a regular broadcast slot every day and invite others to join and listen throughout the week. I would do a listening exercise to start the day every day as it brought a really nice focus. I think the radio format really enabled people to work together and make things.

Group 5 Report - An immersive Art For Futures Lab co-creating multi-sensory expressions for sustainable futures

Facilitated and report written by **Nicole Loeser** (Curator, Social Artist, Board Director at Institute for Art and Innovation (IFAI)) and Angelica **Böhm** (Professor of Scenography, Film University Babelsberg).

1) What was the agenda on each day? What did the group do on each day?

Over the course of four days, the group (consisting of 6 students, one Greek student was missing) tuned into the voices of water — through their bodies, through stories, and through artistic creation. Together, we've explored the element of water as a source of knowledge, inspiration, and renewal. Each day, students were guided through a journey of sensing, imagining, and expressing — culminating in a collective multimedia performance (a so-called ritual theatre) that allowed individual and collective experiences.

Day 1: Get Wet (Arrival & Opening into the Element)

- (Morning Yoga with water-inspired asanas with Angelica)
- Introductions to workshop and participants individuals skills and interests followed by a Silent Walk (sensory connection & journaling)
- Mythic dive: Learning about Greek and Ancient water gods representing different energies
- Learning about history of the island and site-specific and current water-related challenges
- Excursion to local water site (Bus Tour)

Day 2: Getting into the Flow (From Awareness to Artistic Interpretation)

- Joint reflection of Day 1 – collection of individual visions and ideas for ritual theatre
- Impro Theater (choir, experimentations with sounding and singing)
- Learning from local expert about challenges and initiatives ref. water issues, followed by guided meditation and visioning process (positive vision for Evia island incl. look and feel of the island in 20 years) -each student presented
- Location scouting for final presentation
- Design sprint on final ideas (site-specific)-presentations of individual ideas and joint conclusions
- Co-creation labs for media and performance experiments (basic concept for rituals, characters, media, and location)

Day 3: Dive In (Creative Production)

- Deepening connection with water through artistic expression (sound, music and video recordings and experiments)
- Collecting nature-based props and costumes for ritual theatre, and site-specific artworks
- Developing scripts for the characters
- Working groups for co-creation of drawings, soundscapes, music, costumes, stage design, ritual flow, script writing, audience experience development
- Decisions on everyone's role for the ritual theatre

Day 4: Rising to the Surface (Presentation & Reflection)

- Started ritual before each one was entering the bus ride to university by collecting a stone from the beach
- Installed technical equipment, printed posters and decoration, instructions ref. visitor guidance
- Rehearsals for roleplay, Sound and video checks
- Final multimedia showcase incl. rituals, performances, land art, and documentation
- Invited all participants to share their experiences with the element of water & reflecting on what water has told them

2) Did you use special methods and if yes, at what point of the process?

- Preparation of myths, knowledge base of initatives, historical facts, and bringing props
- On site: Silent Walk, AFFL incl. Guided Mediations and Design Sprint, Impro Theater and Roleplay, Dialogs based on Greek methods, interdisciplinary teamwork and co-creation, site-specific nature-based installations, always journaling, recording, presentations and reflection of each one (for all methods check agenda for timing)

3) What difficulties and challenges did you face?
Mindset ref. futures were mostly dystopian and envision positive futures was difficult, but with all our methods we could guide them to be more hopeful and become actionable. Technically, location-and food-wise, we adapted to all challenges.

4)What surprised you in a positive way?
Wonderful co-creation, motivation and inspiration, openness to all methods and topics, interests developed and shared ref. all kinds of topics and media. All different skills were integrated and leveraged.

5)What did you learn?
AFFL going Ritual Theater is working and of high interest regarding site-specific installation, media production and experience design. It is possible to co-design experiences by participants with diverse backgrounds (professional and cultural) and skill sets. If the topic is set, first research is done and some props are prepared, the installation and media production can be developed within 4 days. Also guided meditation was well accepted and created more openness and personalized outcomes.

6) What would you do differently next time (suggest improvement for future iterations of your workshops)?

If we would have more time, we could deepen knowledge transfer and develop richer experiences as well as better media archiving or making it accessible online to a broad audience.

7) You are welcome to add remarkable things at your own judgement, but keep it short and reduce to the essentials.
The Greek camp has inspired us to realize the AFFL Ritual Theater and to incorporate the rich Greek mythologies. Our focus was how to connect Ancient and contemporary knowledge and experience. Therefore, we also came earlier to Greece to dive deep in the myths and architecture in Athens.

Group 6 Report - Water ecosystems: Investigating the essence and the information that water carries

Report written by the tutors Nafsika Papageorgiou [N.P.], Dimitris Delinikolas [D.D.], Orestis Karamanlis {O.K.]

1) What was the agenda on each day? What did the group do on each day?

Day 1:

The tutors presented the concept of the project and the available tools and methods. In addition, some examples were given on the final outcome of the project. Some brainstorming followed on the next steps (where to go, what to do).

Day 2:

The Group visited the beach near Larko dock. There, different sampling methods for marine biology research were used in order to gather the needed information of the project. Afterwards, back in the university's buildings the group visited the "Biodiversity and Ecosystem Services" Laboratory where the students had the opportunity to examine and experiment with the samples they collected during the field trip.

Day 3:

After a short discussion, the students decided to create a short film that could function as a standalone artistic installation. Their aim was to highlight the fundamental importance of water for the existence and future of humanity and to emphasize how much remains unknown about the underwater world. The students formed three groups (sound, video, text) that worked independently.

Day 4:

Finalization and presentation of the project

2) Did you use special methods and if yes, at what point of the process?

Marine biology research methods (Day 2):

- For documenting the underwater landscape and life an underwater drone (remote operating vehicle - ROV) equipped with a standard and a 360-degree camera was used. Also, an action waterproof camera and smart-phone cameras were used for some additional footage.
- For documenting marine life, a mini sediment sampling was conducted on the beach. Research tools such as corers and sieves were used. The samples were brought back to the lab and after some preparation from the tutors the students could observe the organisms they collected under a magnifying lamp or/and under a stereoscope. Footage from the magnified organisms and other materials were captured through smart-phones and web-cameras.

Sound (Day 2,3, 4)

The team used hydrophones (underwater microphones) to sample audio content of the waterfalls (at Agia Kyriaki) and the sea (Larko & Dafni beaches). The recordings were brought back to the soundlab and were manipulated to create the soundtrack for the footage. All music background was created by the students who formed a small choir; the recordings were later processed further in the sound studio (C 207) to create rich harmonic textures.

Video (Day 2,3, 4)

Three types of videos were used during the workshop days. Video from standard cameras, video from the underwater camera of the ROV and finally 360 VR panoramic video which was recorded with a camera that was rigged on the ROV for the workshop. The rigging of the 360 camera presented various challenges, but being able to film remote controlled underwater VR footage was a new affordance for both of the teams. It was a result of the collaboration between the marine research team and the cinematic VR department of the digital arts school.

3) What difficulties and challenges did you face?
The student cohort (a group of 6) seemed not to be having an artistic background, hence they approached the task by adopting a mostly conservative artistic language overall. Most seemed to lack creative thinking and the motivation to experiment in unconventional ways, even though they were certainly committed to the task and worked adequately within time limits.

Rigging the 360 camera to the ROV took a bit of testing so that the ROV's balance would not be hindered by the extra weight. A clamp system was used together with self-made rigging support to attach the camera firmly and in appropriate distance for the panoramic shooting. We could not monitor the camera with wi-fi and bluetooth and the biggest challenge was to time the shooting intervals and guide the filming using the ROV's onboard camera.

4)What surprised you in a positive way?
The students were very enthusiastic working with research equipment and were interested in understanding different aspects of marine biodiversity.
There was a poetic undertone in the students' work. They decided to use an ancient Greek text on the god of sea Poseidon, to add context to the whole exploration. Also, their main conceptual approach was to compare the underwater lifeforms and compare them to our collective fascination with aliens and xenomorphs. In their video they noticed that most alien designs are derived by aquatic forms.
In the editing of the VR video the editors reoriented some of the footage to have the bottom of the sea appear on top, which led to a very interesting and unexpected VR experience. They also combined the audio by the hydrophones to create an otherworldly soundtrack for the experience leading to a 3-minute short VR video.

5) What did you learn?
[N.P] The collaboration with the digital arts department gave me several new ideas on how to transfer scientific knowledge to the general public. I believe that VR based experience can be used as a tool for this but also for raising public awareness on sustainability issues.

[D.D.] The most important aspect of the workshop to me was the fact that we were introduced to some methodologies of marine biology research in practice. I found the students' parallelism between imagined alien forms in sci-fi and aquatic biology to be quite fascinating in the way the underwater abyss has become our most influential environment for imagining outer space.

[O.K] I was very interested in the "art and science" aspect of this project, and the possibilities of fusing biology with digital art. The combination of utilising 360 audio / video content was also interesting to explore.

6) What would you do differently next time (suggest improvement for future iterations of your workshops)?
Overall, the 5-day workshop was deemed successful. It is not entirely clear how the main theme of the course has been tackled through the 6 group deliverables: Ultimately, how can we reduce energy consumption for the production of digital art?
Also, the students seemed overwhelmed with the information gathered from the research activities and the time was limited, thus it a more directed guidance would be an option to have a more artistic result.