Term: **2 sem. (summer)**	**Virtual tour and building techniques for a sustainable city / Elective design II**	ECTS: **5**
Type of studies: **MSc in Arch.**		Year: **2025/2026**

Workflow poster - Virtual tour and building techniques for a sustainable city (source: *E. Doria UNIPV*)

Seminars & assignments: 60 h
Teacher: Elisabetta Doria, Ph.D., University of Pavia & additional teaching staff from Gdańsk Tech, Poland

Brief description of the subject:

This course focuses on the urban and architectural analysis of a selected case study street through the post-production and application of 360° panoramic photography to create an informative virtual tour. The tour will be developed using a series of on-site pano360 captures from Heweliusza Street in Gdańsk.

With the guidance of tutors, students will analyse the street and design a navigable, content-rich virtual environment enhanced with semantic annotations, including hotspots, labels, thematic categories, and interpretative layers. The aim is to produce an immersive, user-friendly output with a high level of informational clarity and accessibility.

The course also equips students with practical tools and methodological guidance to independently plan and carry out additional 360° image acquisitions. This will enable them to document and assess how the case study area changes under varying climatic and environmental conditions, in collaboration with the "Virtual Tour–Based Workflow for Digital Simulation" course (Complementary Elective Design II). The course is linked to the CLIMAGEN Horizon project and Urban ElemenTREE DUT project.

Goals:

The intensive course **Virtual Tour and Building Techniques for a Sustainable City** explores urban space and building systems through immersive digital representation, focusing on sustainability, climate responsiveness, and environmental performance at the street scale. By working on Heweliusza Street as a real case study, students will use 360° panoramic photography and virtual tours as analytical and communicative tools to observe, interpret, and assess urban form, construction techniques, and environmental conditions.

The course emphasizes how digital workflows and immersive media can support sustainable urban analysis, documentation, and scenario-based evaluation, including changes related to climatic and environmental variability over time.

Educational goals:

- Understand key principles of sustainable urban design and building techniques at the street and neighborhood scale, including environmental performance, resilience, and adaptation to climate conditions.
- Analyse the spatial, technological, and environmental characteristics of Heweliusza Street, identifying critical issues and opportunities related to sustainability, comfort, accessibility, and urban quality.
- Critically examine how immersive digital tools (virtual tours, 360° imagery, layered information) can enhance the observation, interpretation, and communication of urban and building-related analyses.
- Develop an integrated perspective that connects urban morphology, building technologies, and environmental factors, fostering multidisciplinary thinking and collaborative work.
- Reflect on the role of digital documentation and visualization in supporting sustainable planning, monitoring transformations, and informing future design strategies.

Activities and outputs:

- Acquire the ability to design and produce an interactive virtual tour as a structured analytical output, including scene organization, navigation logic, and user-oriented interface design.
- Create and manage a coherent system of semantic annotations within panoramic scenes (hotspots, labels, thematic categories, interpretative layers) to communicate urban, technological, and environmental analyses effectively.
- Become autonomous in planning and executing additional 360° photographic acquisitions, following shared protocols to ensure consistency and comparability across different dates and conditions.
- Integrate temporal and environmental data into the virtual tour (time-based layers, comparisons, and variants) to document and evaluate changes related to climate, weather, and use conditions.
- Deliver a final immersive and informative virtual tour prototype that demonstrates methodological rigor, clarity of analysis, and effective communication of sustainability-related insights at the urban and building scale.

Block course:
online lectures (Wednesdays) 18.03.2026 and from 15.04-27.05. 2026 + intensive workshop (from 24.03 - 27.03 2026 - 4 days) in Gdansk (group of max 15 students)
The course is structured to be done in parallel with the one entitled " Virtual tour based workflow for digital simulation"

Schematic content of the course:
Seminars (online):
      1. Lecture / Introduction to the topics of urban sustainability, virtual tours and semantic analysis
      2. Lecture / Course overview and workflow
Activities on field (in person):
      3. Lecture / Street-space analysis and identification of criticalities, values, and potential transformation areas
      4. Practice / 360° acquisition protocol and surveys
      5. Practice / First data organization and handover
Seminars (in person/online):
      6. Lecture / Post-production of 360° panoramas
      7. Practice / Virtual tour software authoring: structure and navigation + use of surveys cards
      8. Lecture + Practice / Semanticization methods
      9. Practice / Trial prototype development
Seminars (online):
      10. Practice + Review / Preparation for autonomous acquisition
      11. Online Review / Integration check
      12. Online Review / Time-based semanticization
      13. Online Review / Prototype refinement and publishing
      14. Final presentation of outcomes

Educational Outcomes
By the end of the course, students will be able to design, develop, and publish an interactive virtual tour based on 360° panoramic datasets, applying appropriate post-production standards, clear navigation logic, and a coherent information structure.
Students will be capable of semanticizing panoramic scenes through the use of hotspots, labels, thematic categories, and interpretative layers, effectively translating urban, architectural, building-technology, and sustainability-related analyses into an accessible and readable immersive environment.
They will acquire the skills to autonomously plan and carry out additional 360° photographic acquisitions, following shared protocols to ensure consistency and comparability with the baseline dataset provided within the CLIMAGEN Horizon project.
Furthermore, students will be able to integrate time-based, climatic, and environmental observations, such as daylight conditions and seasonal variations, into the virtual tour through explicit temporal tagging, comparative logic, and layered visualization, producing an immersive output suitable for academic evaluation, dissemination, and communication of sustainability-oriented urban analyses.

This is a hands-on, project-based course. Basic computer literacy is required, and students are expected to work in pairs, each pair equipped with a laptop/tablet with smart-pen.
Special attention will be given to the integration of daylight and environmental analysis within the virtual tours, encouraging students to critically assess how lighting conditions, climate, and environmental factors influence urban spaces and building performance.

Methods:
The course adopts a blended, project-based learning approach that combines short lectures, guided demonstrations of virtual tour, surveys and 360° post-production workflows, and intensive hands-on activities. The initial phase of the course is structured as a supervised training period, aimed at establishing shared methodologies, technical standards, and analytical criteria for the creation of virtual tours and the semantic interpretation of urban and building-related data.
In the subsequent phase, the course functions as a studio and review environment, supporting students as they carry out autonomous 360° acquisitions on-site and integrate additional climatic, environmental, and daylight-related observations into their projects thanks to surveys cards. Learning is reinforced through iterative feedback sessions, peer discussion, troubleshooting workshops, and the progressive refinement of the virtual tour, culminating in the public presentation and academic review of the final immersive digital prototype.

Learning Outcomes:
Students will be able to critically interpret urban spaces and building systems through immersive media, framing analytical narratives that address sustainability, building technologies, and environmental performance at the urban scale.
They will be capable of defining, structuring, and justifying a coherent semantic framework that translates on-site observations and analyses into clear, communicable categories and interpretative layers, supporting comparative readings, time-based evaluation, and informed, decision-oriented discussion related to sustainable urban development and climate-responsive design.

Prerequisites:
This course is open to master's students with a background in urban planning, architecture, architectural history, or related disciplines. While no specific prior coursework is required, participants should have:
• Basic knowledge of architectural history and heritage conservation to understand key concepts of adaptive reuse and museum transformations.
• Familiarity with urban planning principles, particularly in relation to historical contexts and regeneration strategies.
• Fundamental design and technical skills, including spatial analysis and architectural representation.

• Ability to work with digital tools for research, analysis, and presentation (basic proficiency in CAD, GIS, or rendering software is useful but not mandatory).
• An interdisciplinary mindset, as the course encourages collaboration between different fields of expertise.
A strong interest in the relationship between old and new in architectural and urban contexts is highly recommended.

Assessment Methods and Criteria:
Case Study Project: During the intensive course, students will work on a design project focused on a specific case study within the city of Gdańsk. The project will involve: Site Analysis; Design Proposal of the VT using the digital tools explained during the course; Final Presentation of the project (power-point and a virtual tour demo)

The presentation will be evaluated based on clarity, creativity, and the integration of historical and contemporary elements. Throughout the course, students will be expected to engage in research and conceptual development of their projects such as: brief research summary of the site's significance and potential for a new use + conceptual sketches and preliminary VT ideas, which will be discussed and refined through class feedback and peer reviews.

Active participation in group discussions, peer reviews, and collaborative work is essential. Students will be evaluated on their ability to contribute to discussions and share insights about the site, design ideas, and urban context.

Evaluation of the final study and task: The evaluation and the final mark will be determined by the quality of the design proposal, the depth of research, the effectiveness of the presentation, and overall participation during the course.

Study Materials:
Study materials for the course will include: lectures slide, bibliographic references, documentation about the case study and digital tools (a personal computer is recommended, at least one every 3 or 4 students)
Reading List, excerpts of lectures, definitions etc. will be provided to students in digital format with respect to the topic of the seminars.
Additional materials, including articles or specific references, will be shared as necessary throughout the course to
support the students' work on their projects.