

# AESOP Excellence in Teaching Award 2024

## THE URBAN AND ENVIRONMENTAL DESIGN STUDIO

Fabiano Lemes de Oliveira\* and Emanuela Torrigiani\*\*

\*Associate Professor in Urbanism, Department of Architecture and Urban Studies, Politecnico di Milano. E: [fabiano.lemes@polimi.it](mailto:fabiano.lemes@polimi.it)

\*\*Adjunct Professor, Politecnico di Milano; Agronomist. E: [emanuela.torrigiani@polimi.it](mailto:emanuela.torrigiani@polimi.it)



Fig. 1. Online exhibition of the Urban and Environmental Design Studio

### Abstract

The Urban and Environmental Design Studio (UEDS) is a 10-credit mandatory course for master's students in Sustainable Architecture and Landscape Design at Politecnico di Milano. The studio integrates ecological and sustainable principles into urban planning and design across scales. It equips students with skills necessary to address climate change, ecological depletion, and urban crises through systemic design. Students first conduct territorial analyses and develop a green infrastructure plan, followed by the creation of strategic masterplans that integrate nature-based solutions for urban sustainability and resilience.

### Description of course

The Urban and Environmental Design Studio (UEDS) is a 10-credit mandatory course for first-year, second-semester, masters students in Sustainable Architecture and Landscape Design of the School of Architecture, Urban Planning, Construction Engineering (AUIC), campus Piacenza, Politecnico di Milano. The studio theme is 'Energising landscapes: axes of transformation'. The course is composed of two modules, the first related to urban planning and design, led by Prof. Fabiano Lemes de Oliveira, and the second to ecology, led by Prof. Emanuela Torrigiani. They are assisted by three teaching assistants (TAs). The modules are seamlessly integrated into the programme both in terms of delivery and assessment.

The UEDS focuses on the systemic interactions between built and natural systems, bringing together urban planning and design and landscape and ecology. Its main aim is to instil in students both the understanding of the need for a systemic integration of anthropic and natural

systems, as well as the planning and design tools and skills needed to make cities adapt and be resilient to the triple crises of climate change, ecological depletion, and the urban crises.

The UEDS is structured in two parts:

1. Territorial analyses and green infrastructure plan

Students a) analyse key policy documents, b) undertake a systemic analysis of the study area, understanding urban and natural systems, evaluate their current performance and how they influence the functioning of each other; as well as identify the strengths, challenges and opportunities for positive change. Groups then c) explore the nexus between urban challenges (SDGs and local challenges) - ecosystem services and nature-based solutions. Finally, d) they define a green and blue strategy for the axis. This is the basis upon which they select sites for the following stage.

2. Masterplanning: urban and environmental planning and design

The first phase is followed by the definition of a strategic masterplan within the green infrastructure plan for the axis. This is for a portion of the axis, and entails a more detailed vision for the area. Specific site analysis are undertaken, as well as a clear articulation of challenges-ecosystem services and nature-based solutions proposed. Proposals need to demonstrate how they encompass wider discussions on global challenges and respond to localised needs at the same time, particularly with regards to urban sustainability and resilience. The project briefs are developed by students in discussion with professors and the TAs.

## **Learning outcomes**

At threshold level, students are expected to meet the following learning outcomes:

LO1. To develop planning and design proposals that show awareness of the multiple dimensions and complexities of contemporary urban and peri-urban areas, evidencing systemic planning of natural and man-made systems.

LO2. To engage in an iterative multi-scalar planning and design process leading to coherent and resolved proposals

LO3. To employ a workflow identifying global and local challenges, the ecosystem services that could help address them and the appropriate nature-based solutions (NBS)

LO4. To apply ecological principles for the re-structuring of the landscape

## **Institutional setting and students enrolled**

The UEDS starts with the territorial/metropolitan scale which is entirely new to students. Yet, the methodical approach used guides them through the various steps and scales and at the end of the course students are comfortable in shifting lenses from macro to micro scales. One of the course's main contributions to their profile is the ability to integrate ecological and sustainable principles into planning and design across scales. They gain skills and knowledge in a range of topics such as policy analysis, systemic analysis, the ability to plan and design across scales, the understanding of SDGs and how it can be used to propose solutions for sustainable and resilient places, ecological urbanism, green infrastructure planning, landscape structure and nature-based solutions.

The learners in the course are full-time students at master's level. The typical number of students enrolled is approximately fifty. Our UEDS is one of three sections. The course happens in the second semester of their first year of study (the master's is a two-year programme). Students are organised into groups comprising 5 to 6 individuals each. These groups facilitate collaborative learning and project-based activities, fostering teamwork and peer interaction. Despite their diverse origins, the learners share common traits: they are highly motivated, intellectually curious,

and possess a keen interest in the subject matter. Overall, the composition of our student body enriches the learning environment, fostering dynamic discussions, cross-cultural exchange, and innovative problem-solving approaches

### **Planning concept**

The course is based upon the understanding of planning as a systemic endeavour, in which anthropic and natural systems are considered in tandem. It seeks to reconcile city and nature through a reconceptualisation of urban planning and design. Such an approach assumes as a premise that the intrinsic and relational values of nature must be considered beyond its utilitarian values. In this regard, a more-than-human city is sought after and the roles that planning can have in leading towards such possible future explored. Planning is understood in its complexity and extrapolated to consider equality, inclusivity and diversity not only for human beings, but across life forms. Planning is a holistic practice that has, more than ever, a responsibility to address the polycrisis concomitantly and in so doing open up a path for a preferable future in which humans and the rest of nature may lead synergistic relationships.

### **Learning and Capacity Development**

Our approach is interdisciplinary. We articulate urban planning, urban design, landscape architecture and ecological thinking. The premise is that design must be embedded in a systemic approach that generate landscapes which are complex and can simultaneously address the environmental and ecological crises while responding to social demands. Proposals must benefit both humans and non-humans.

The studio involves a combination of lectures by the main professors, guest lectures, discussions, design tutorials, thematic workshops (e.g. Ecosystem services evaluation; Urban Heat Island Effect and water runoff modelling) and interim and final reviews. Lectures themselves provide opportunities for students to participate and actively engage. The analytical and design activities are carried out alongside the delivery of theoretical content in a timely manner so that students can act upon new knowledge straight away, which facilitates content consolidation. Weekly reviews of their work is performed to consolidate the LOs. The course has a comprehensive online learning environment, where lectures and academic and grey literature are deposited. It also serves as a vehicle for discussion and communication. The midterm reviews are conceived as learning events, in which students actively engage.

Exercising students' critical thinking and ability to reflect upon their design and that of peers is fomented through pairing groups for peer discussion, and requesting paired groups, during reviews, to ask questions to each other and provide colleagues comments on how the work could be improved. This proved highly effective and helped imbue students with a sense of their responsibility in building a collective and positive learning environment. Besides, such an approach not only enhances their understanding of the multiple dimensions of urban planning and design, triggering a reflective mindset, but also the development of soft skills related to professional interpersonal communication and verbal presentation in different settings.

### **Innovation**

For this course, a new methodological framework was developed to articulate local and global challenges, ecosystem services and nature-based solutions. Students must study the UN Sustainable Development Goals (including the targets and indicators) and relate them to their sites, while also seeing how local challenges can be linked to global concerns. Subsequently, they must reflect upon what ecosystem services could help address such challenges, and then develop strategies in the form of green infrastructure proposals and nature-based solutions that in turn

would provide such ES. This allows students to realise their work does not only have the potential to bring positive change to local realities, but to contribute to global challenges.

### SDGs\_ES\_NBS approach

What **SDGs** are being addressed?

What local **CHALLENGES** (social, economic, environmental) will be tackled? How do the SDGs manifest themselves locally?

What **ECOSYSTEM SERVICES** can help address those challenges?

What **ACTIONS** based on nature (NBS) could be used to address these challenges (at what scales)?

What is in it for **NATURE**?

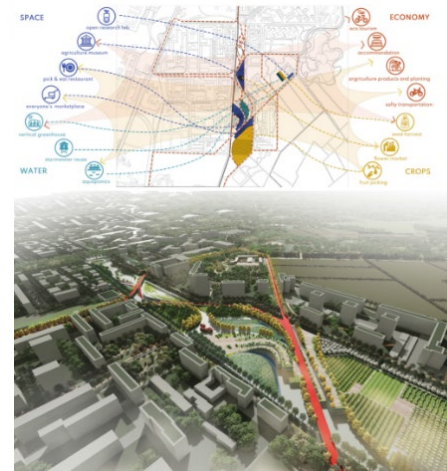
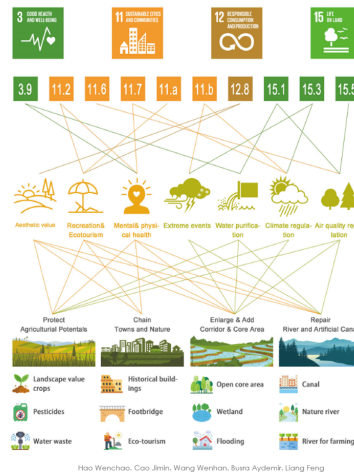


Fig.2. The studio's methodological approach. Images by Hao Wenchao, Cao Jimin, Wang Wenhan, Bursa Aydemir and Liang Feng

Secondly, the 'localisation' of the SDGs is important. Considered at global scale, the SDGs are often seen as too generic or distant from local realities. Our approach requested students to explore ways in which the gaps between the global and local scales could be breached through mapping. Students employed a two-way approach: seeking to identify local manifestations of the challenge expressed in the SDGs and, conversely, how the local challenges relate to the global ones. The exploration of forms of 'localising' the SDGs aims at rendering them actionable at the micro and meso scales.

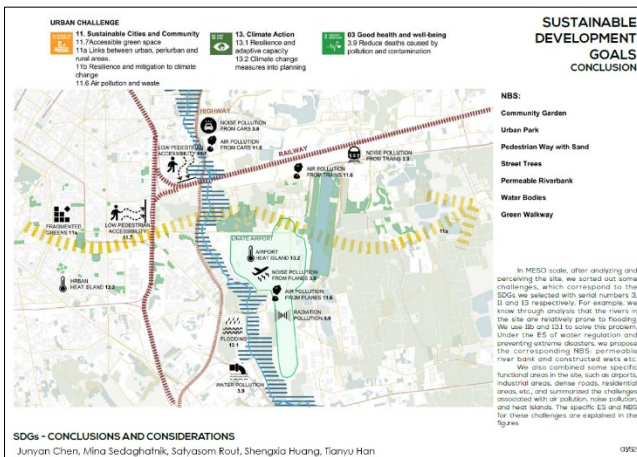


Fig.3. Localising the UN SDGs. Image by Junyan Chen, Mina Sedaghatnik, Satyasom Rout, Shengxia Huang, Tianyu Han

Finally, we sought to forge a more-than-human approach to planning in which synergies between humans and non-human life and landscapes are pursued, and develop scenarios in which nature's agency, intrinsic values and needs are significantly taken into account. The studio integrates urban planning and design with ecological thinking throughout its phases. The employment of the SDGs\_ES\_NBS methodology is infused with the question of 'what is in it for nature?'. Students are presented with the need to consider not only the utilitarian values of nature, but also the relational and its intrinsic values.

## Theory and practice integration

Throughout the course, we are deeply committed to bridging the gap between theory and practice. Case studies are presented and discussed alongside theoretical content in lectures. Collaborators from various sectors, including practitioners from urban planning and design firms and public officials, are invited to deliver guest lectures, offering firsthand insights and experiences. These practitioners share real-world challenges, innovative solutions, and lessons learned from their work, providing students with valuable perspectives on the practical application of course concepts.

Furthermore, students are exposed to live projects and ongoing initiatives during the course. They gain exposure to the complexities of urban planning and design in action. In addition, policy analysis plays a central role in phase 1 of the course. Students scrutinise policy documents and regulatory frameworks, analysing the socio-eco-political dynamics shaping urban development. This hands-on policy analysis equips students with a deep understanding of the issues facing the case study city across different levels of governance and scales.

Moreover, the articulation of local and global challenges serves as a guiding principle throughout the course. By examining the interconnectedness between local issues and global sustainability goals, students learn to think globally while acting locally. This holistic approach encourages students to consider the broader implications of their actions and interventions, fostering a sense of responsibility towards both local communities and the global environment.

Through these actions, students develop a comprehensive understanding of urban planning and design, preparing them to tackle real-world challenges with confidence and expertise, while also providing insightful and cutting-edge visions of preferable futures.

### **Assessment**

Phase 1 introduces students to fundamental concepts and tasks essential for understanding and engaging with urban environmental design strategies. The first task involves a comprehensive review and synthesis of key information extracted from policy documents. These documents encompass various scales, ranging from regional to city levels, and students are specifically tasked with exploring the role of nature in urban planning, emphasising sustainability and resilience considerations. The second task is a systemic analysis of the students' designated transect, focusing on both urban and ecological systems. Students are expected to grasp the intricacies of the relationships between anthropic and ecological systems, identifying their interplays, conflicts, synergies, and potentialities. Task three revolves around exploring the interconnectedness between the Sustainable Development Goals (SDGs), ecosystem services (ES), and nature-based solutions (NBS). Students are required to select three SDGs and corresponding targets, followed by the identification of relevant ecosystem services. Additionally, they must contemplate how NBS can facilitate the delivery of ES, thereby addressing the challenges highlighted by the chosen SDGs. The final task in phase 1 centers on green infrastructure planning, wherein students collectively develop a vision for their axis. This vision should be intricately linked to the tasks undertaken in the preceding phases, demonstrating alignment with sustainability and resilience principles.

Phase 2 marks a transition to a more detailed level of planning, with students focusing on developing a masterplan for a specific location within the broader green planning strategic framework. This phase entails a shift from macro to meso-micro scales, and supports the development of urban design skills. Throughout both phases, students undergo midterm and final reviews, culminating in a summative assessment. Feedback mechanisms, including peer reviews and the utilisation of a marking matrix, are integrated to ensure comprehensive evaluation and continuous improvement throughout the course.

### **Student feedback and third party feedback**

The School collects students' feedback for each course. It is anonymous and consists of a multiple-choice questionnaire and open questions. The UEDS has consistently achieved high overall student satisfaction since 2019/2020: between 3.6 and 3.8 out of 4, compared to the average of the school of 3.13.

The high student satisfaction, we believe, derive from the following: 1. Learning as a transformational endeavour; 2. The importance of co-constructing knowledge; 3. Relating local and global challenges, 4. The synergies between urban design and ecological thinking; 5. A

more-than-human approach; 6. Professional setting up and delivery of the courses; 4. A positive learning environment; 5. Building collectivity; and 6. The construction of a logical, insightful and creative argument, leading to novel solutions.

The course has been identified as a best practice internationally on the inclusion of the SDGs into teaching and Prof. Lemes de Oliveira was consequently invited to present it at the EAAE Workshop 'Sustainable Development Goals (SDGs) in education & research', within the Symposium 'Architectural Education in Times of Uncertainty' at TU Delft.

### **Lessons learned and transferability**

The course presents approaches and elements that could be replicated, as follows:

#### 1. Novel Methodology for Local-global Alignment

Our course introduces a pioneering methodology designed to bridge the gap between global sustainability goals and local challenges through ecosystem services and nature-based solutions. By equipping students with the tools to relate the SDGs to their specific sites, they develop strategies that not only address local issues but also contribute to global objectives. This methodology is adaptable and transferable to diverse contexts, offering a systematic approach for aligning local actions with global initiatives and for designing inclusive and resilient urban environments.

#### 2. Localising SDGs for action

These enable students to render the SDGs actionable at micro and meso scales. By cross-referencing local challenges with global objectives through mapping exercises students develop insights that can inform targeted interventions. This approach is transferrable and can support students contextualise SDGs in different settings to drive positive change at local levels.

#### 3. More-Than-Human Approach for Holistic Planning

By considering on equal grounds nature's intrinsic, relational and utilitarian values, students develop solutions that foster synergies between humans and non-human life. This approach transcends geographical boundaries, being applicable to diverse urban contexts and planning and design disciplines.

Potential barriers include the need for adaptation to fit existing frameworks and courses, requiring specific faculty expertise. Mitigation involves collaboration with course leaders and training initiatives. Challenges may arise regarding differing values of nature and cultural relevance, addressed by broadening case study use to enhance cross-cultural understanding.

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