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Enhancing of Heritage Awareness and Sustainability of Built Environment in Architectural and Urban Design Higher Education

STATEMENTS

for Teaching through Design for Sustainability of the Built Environment and Heritage Awareness

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CONTRIBUTORS:
HERSUS CONSORTIUM MEMBERS

UB-FA
Vladan Djokić
Ana Radivojević
Ana Nikezić
Jelena Živković
Nataša Ćuković Ignjatović
Milica Milojević
Jelena Ristić Trajković
Aleksandra Milovanović
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Panayiota Pyla
Odysseas Kontovourkis
Maria Nodaraki
Theodora Hadjipetrou
Stavroula Thravalou
Andreas Savvides

AUTH
Konstantinos Sakantamis
Alkmini Paka
Kleoniki Axarli
Maria Doussi
Angeliki Chatzidimitriou
Sofoklis Kotsopoulos

USE
Mar Loren-Méndez
José Peral López
Julia Rey-Pérez
Marta García-Casasola Gómez
Daniel Pinzón-Ayala
Enrique Larive López
Roberto F. Alonso-Jiménez
María F. Carrascal Pérez
Marta Freniche Velázquez

External collaborators:
Marco Chiuso
Mauro Marzo
Maddalena Bassani
Viviana Ferrario
Iordanis Sinamidis
Dario Trabucco
Constantinos Vassiliades
Chryso Heracleous
Danae Zacharia
Giulia Rossi
Gianluca Spironelli
Caterina Balletti
José M. Aladro Prieto
Víctor Fernández Salinas
Angel González Morales
Celia López Bravo
Celia Martínez Yáñez
Pablo Millán Millán
Daniel Navas Carrillo
Lourdes Royo Naranjo
Victoria Segura Raya

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IMPRESUM

EDITORIAL BOARD:
Vladan Djokić, Ana Nikezić, Mar Loren-Méndez, Konstantinos Sakantamis, Maria Philokyprou, Emanuela Sorbo/ *HERSUS Scientific Coordinators*

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Statements for Teaching through Design for Sustainability of the Built Environment and Heritage Awareness

IO3 lead: Vladan Djokić, Ana Nikezić, UBFA

HERSUS Project leader: Vladan Djokić, UBFA

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Content

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DESIGN APPROACHES

Heritage Reprograming

×

Construction Centred Design

×

Environmentally Responsive Design

×

Energy Conscious Design

×

Climate Sensitive Design

×

Whole-Lifecycle Design

×

Carbon Neutral Design

×

Passive/Active Sustainable Design

×

Community Building and Representation

×

Renewable Energy Integration

×

Historical Urban Landscape- HUL

×

Design for All in Cultural Heritage

×

Thermal Comfort Design

×

Visual Comfort Design

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Green Blue Infrastructure

×

Acoustic Comfort Design

×

Multiscale Design Approach

UB-FA

×

Jelena Živković

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design approaches
statements

GREEN BLUE INFRASTRUCTURE (GBI)

зелено плава инфраструктура • Green Blue Infrastructure • Μπλε Πράσινες Υποδομές • Infraestructuras Azul-Verde (IAV)

GENERAL DEFINITION/ EXPLANATION

EC Green Infrastructure Strategy (EC, 2013) defines Green Infrastructure (GI) as *"a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings*." Although the EC definition includes aquatic ecosystems, the expression "green and blue infrastructure" (GBI) has recently started to be used in order to highlight more explicitly the aquatic dimension of the concept, alongside the terrestrial one.

GI is a natural spatial structure that serves the interests of both people and nature. In contrast to usually mono-functional 'grey' infrastructures - GI is *multifunctiona*l. It aims to enhance nature's ability to deliver multiple *ecosystem goods and services* that contribute to sustainable development by providing variety of environmental, social, biodiversity as well as climate change and adaptation benefits. Elements of GI differ in relation to scale, and span from forests, regional parks, rivers and floodplains etc., at regional level, to street trees, hedges, ponds, green roofs and walls, etc. at local site scale.

GI planning and design is based on holistic understanding of the complex interrelations and dynamics of *socio-ecological systems*, and assumes *interdisciplinary* and *multi-scale* approach, thus creating a new challenges to academic education.

WHAT?

CONTENT

The purpose of integrating GBI into AUD education is to help development of future professionals capable to understand socio-ecological processes and benefits from ecosystem services, and to work in interdisciplinary environment in order to produce design solutions for benefit of both people and nature. Although GI can be planned and applied at both regional and local (city/town/village) level, the latter is focus of AUD education. Therefore, besides providing knowledge and awareness on general GI related concepts, processes and benefits, the focus of AUD teaching and learning activities should be on developing students' knowledge and skills to plan and design context-specific, integrated and sustainable solutions by integrating connected and multifunctional GBI elements into architecture/urban design projects in a knowledge-based, innovative and creative manner.

The students should be able to understand, design and assess integrated AUD interventions (at city/neighbourhood/site/building scales) in relation to key areas of benefits from GBI: a) *environmental quality* (air quality, temperature and water regulation; erosion and noise reduction…), b) support of biodiversity; c) provision of food, fibre; and d) quality urban living (recreational experiences, social interactions, aesthetic qualities…). Besides that, the understanding of how natural and cultural heritage contributes to sustainable delivery of GBI in specific context is important part of integrating this concept in AUD education.

HOW?

METHODS

Different general teaching philosophies may be applied for integrating GBI in AUD education. While for theoretical and seminar courses problem-based learning on GBI may be appropriate, studio based learning should be based on place and design based teaching philosophies.

Specific character of GBI as nature-based, multi-scale and multifunctional concept, makes it necessary for students to develop *system and critical thinking* skills as well to learn about and develop skills to conduct *sustainability analysis* within interdisciplinary teams.

Student-centred teaching and learning approach is the most appropriate for environmental education in general, and especially for learning and developing skills for GBI planning and design in AUD education. *Different learning environments are appropriate* for learning on GBI. While learning on GBI concept, related processes and possible design strategies can be performed in *class environment*, specific learning value will be provided through *place based* educational approach and different forms of *on-site learning*: field work and contact with local communities, etc..

WHY?

GOALS

The purpose of the learning/teaching process and activities in relation to GBI is to help AUD students:

- Get knowledge on *socio-natural processes* in built environment and on how can *eco-system services and nature-based solutions,* implemented through GBI, contribute to sustainable development and nature conservation and biodiversity, specifically in human settlements. *Interdisciplinary and system approach*, as well as widening the knowledge base to include variety of expert and lay knowledge, are important to help students understand how natural and cultural heritage may guide context-specific and appropriate design solutions.

- Learn how to approach *implementation of GBI* in AUD at *different scales* (City/metropolitan level, Neighbourhood level, Site/building level); Teaching on best practices and interdisciplinary and collaborative projects are of special importance;

- Develop *thinking, communication and design skills* that help integrate GBI in architecture and urban design in knowledge-based, socially aware and creative way. System, critical and creative thinking as well as learning through design are crucial for achieving this goal;

-Develop awareness of the nature in built environment and benefits it can provide to people, for which both class, collaborative and field work activities are important.

TEACHERS' COMPETENCIES

In order to effectively educate AUD students on concept, purpose, elements and benefits that GBI may provide to people and nature, as well as how to integrate it into planning and design of human settlements, teachers should develop specific competences:

- They should be able to conceptualise and organise collaborative work with academics/students/professionals from different disciplines in order to help AUD students develop skills related to interdisciplinary work as well as for work with local communities.

- Besides that, depending on type of course, teachers should function as knowledge and skilful experts, but also as trainers/coaches that, in the context of student-centred design studio, enables students to develop authentic and creative approach to environmental issues and GI implementation in design.

- Finally, since knowledge about GI elements and application is constantly evolving, they are supposed to be lifelong learners and reflective agents, as well as innovators in transferring knowledge and skills to students.

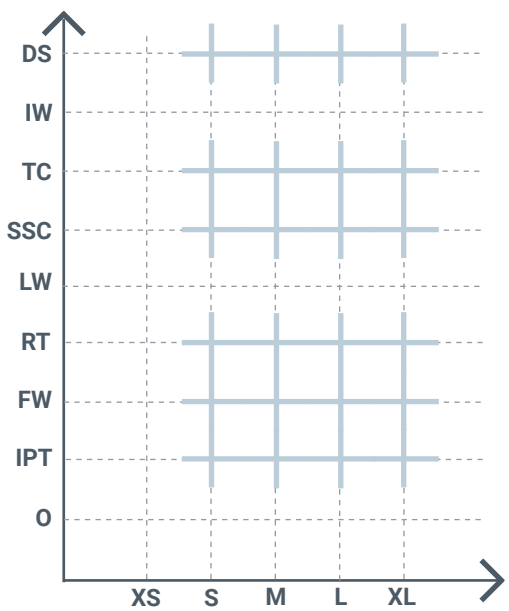
This approach is in accordance with answers provided by experts in IO2 Questionnaire that stress the importance of interdisciplinary approach and application of innovative approaches to education.

COURSE TYPE

- [x] Design Studio (DS)
- [ ] Intensive Workshop (IW)
- [x] Theory Course (TC)
- [x] Seminar (short comprehensive) (SSC)
- [ ] Laboratory work (LW)
- [x] Research Thesis (RT)
- [x] Field work (FW)
- [x] Internship Practical training (IPT)
- [ ] Other (O)

SCALE

- [ ] Construction Detailing and Interior Design Scale (XS)
- [x] Architecture: Buildings Scale (S)
- [x] Urban Design Scale (M)
- [x] Urban and Regional Planning Scale (L)
- [x] Landscape Scale (XL)



LEARNING OUTCOMES

1 Ability to create architectural designs that satisfy both aesthetic and technical requirements. The student could have the ability to:

- [ ] prepare and present building design projects of diverse scale, complexity, and type in a variety of contexts, using a range of media, and in response to a brief;
- [x] understand the constructional and structural systems, the environmental strategies and the regulatory requirements that apply to the design and construction of a comprehensive design project;
- [ ] develop a conceptual and critical approach to architectural design that integrates and satisfies the aesthetic aspects of a building and the technical requirements of its construction and the needs of the user.

2 Adequate knowledge of the histories and theories of architecture and the related arts, technologies and human sciences. The student will have knowledge of:

- [x] the cultural, social and intellectual histories, theories and technologies that influence the design of buildings;
- [ ] the influence of history and theory on the spatial, social, and technological aspects of architecture
- [x] the application of appropriate theoretical concepts to studio design projects, demonstrating a reflective and critical approach.

3 Knowledge of the fine arts as an influence on the quality of architectural design. The student will have knowledge of:

- [ ] how the theories, practices and technologies of the arts influence architectural design;
- [ ] the creative application of the fine arts and their relevance and impact on architecture;
- [ ] the creative application of such work to studio design projects, in terms of their conceptualisation and representation.

4 Adequate knowledge of urban design, planning and the skills involved in the planning process. The student will have knowledge of:

- [x] theories of urban design and the planning of communities;
- [x] the influence of the design and development of cities, past and present on the contemporary built environment;
- [x] current planning policy and development control legislation, including social, environmental and economic aspects, and the relevance of these to design development.

5 **Understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scale. The student will have an understanding of:**

- ☐ the needs and aspirations of building users;
- ■ the impact of buildings on the environment, and the precepts of sustainable design;
- ■ the way in which buildings fit into their local context.

6 **Understanding of the profession of architecture and the role of the architect in society, in particular in preparing briefs that take account of social factors. The student will have an understanding of:**

- ☐ the nature of professionalism and the duties and responsibilities of architects to clients, building users, constructors, co-professionals and the wider society;
- ☐ the role of the architect within the design team and construction industry, recognising the importance of current methods and trends in the construction of the built environment;
- ☐ the potential impact of building projects on existing and proposed communities.

7 **Understanding of the methods of investigation and preparation of the brief for a design project. The student will have an understanding of:**

- ☐ the need to critically review precedents relevant to the function, organisation and technological strategy of design proposals;
- ☐ the need to appraise and prepare building briefs of diverse scales and types, to define client and user requirements and their appropriateness to site and context;
- ☐ the contributions of architects and co-professionals to the formulation of the brief, and the methods of investigation used in its preparation.

8 **Understanding of the structural design, constructional and engineering problems associated with building design. The student will have an understanding of:**

- ☐ the investigation, critical appraisal and selection of alternative structural, constructional and material systems relevant to architectural design;
- ☐ strategies for building construction, and ability to integrate knowledge of structural principles and construction techniques;
- ☐ the physical properties and characteristics of building materials, components and systems, and the environmental impact of specification choices.

9 **Adequate knowledge of physical problems and technologies and the function of buildings so as to provide them with internal conditions of comfort and protection against the climate. The student will have knowledge of:**

- ■ principles associated with designing optimum visual, thermal and acoustic environments;
- ☐ systems for environmental comfort realised within relevant precepts of sustainable design;
- ☐ strategies for building services, and ability to integrate these in a design project.

10 **The necessary design skills to meet building users' requirements within the constraints posed by cost factors and building regulations. The student will have the skills to:**

- ☐ critically examine the financial factors implied in varying building types, constructional systems, and specification
- ☐ understand the cost control mechanisms which operate during the development of a project;
- ☐ prepare designs that will meet building users' requirements and comply with legislation, appropriate performance standards and health and safety requirements.

11 **Adequate knowledge of the industries, organisations, regulations and procedures involved in translating design concepts into buildings and integrating plans into overall planning. The student will have knowledge of:**

- ☐ the fundamental legal, professional and statutory responsibilities of the architect, and the organisations, regulations and procedures involved in the negotiation and approval of architectural designs, including land law, development control, building regulations and health and safety legislation;
- ☐ the professional inter-relationships of individuals and organisations involved in procuring and delivering architectural projects, and how these are defined through contractual and organisational structures;
- ☐ the basic management theories and business principles related to running both an architects' practice and architectural projects, recognising current and emerging trends in the construction industry.

BUILT ARCHITECTURAL / URBAN DESIGN PROJECT EXAMPLE

Project title and location:
✕ Green Streets Program", Portland,Oregon, US

Authors:
✕ City of Portland, Environmental Services

Year (period) of the project
✕ 2005-

The city of Portland, US uses green streets, ecoroofs, trees, and other green infrastructure elements to manage stormwater, protect water quality and improve watershed health. It is famous and awarded for developing "Green Streets Program" that turns conventional streets into 'green streets' by installing storm-water street planters (small rain gardens, fig.2) in the sidewalks, curb extensions, roundabouts, and traffic islands. These planters intercept, slow, cleanse, and infiltrate runoff from streets. Green streets increase urban green space, improve air quality, replenish groundwater, and reduce air temperature. They also have educational role (fig. 1) and contribute to aesthetics and sociability of space. "Green Street Steward Program" was additionally introduced, aiming to encourage community members to volunteer in the care and maintenance of GI systems (fig.3). For more details, see:

https://www.portlandoregon.gov/bes/34598
https://www.portlandoregon.gov/sustainablestormwater
https://www.asla.org/awards/2006/06winners/341.html

Figure 1. Green Streets map
Source: Bernie Alonzo CC BY-NC-SA 2.0

Figure 2. Green street planter after a rain in Portland, Oregon,
Source: BES Portland CC BY-NC 2.0

Figure 3. Girl Scouts as Green streets stewards
Source: BES Portland CC BY-NC 2.0

RELEVANT LITERATURE / SOURCES FOR FURTHER RESEARCH

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