HERSUS

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

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HERSUS

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UB-FA

×

Bojana Zeković

05/18

design approaches
statements

CLIMATE-SENSITIVE DESIGN

климатски сензитивно пројектовање • Climate-sensitive Design • Κλιματικά Ευαίσθητος Σχεδιασμός • Diseño Climático

GENERAL DEFINITION/ EXPLANATION

Climate-sensitive design is the approach to architectural design which is routed in the understanding of specific climate conditions and its impacts on building design. Primarily it is related to issues of achieving human comfort in buildings through building design that is aligned with local climate conditions. It is similar to terms *climate responsive design*, *bio-climatic design*, or *design with climate*, last referring to the seminal book of Victor Olgyay (1963, Princeton University Press). This design approach today is considered a basis for energy-efficient, green or sustainable design. It is also deeply connected to studies of vernacular architecture as part of the built heritage, since vernacular architecture is always climate sensitive and offers lessons for contemporary reinterpretation. It may appear strange to even highlight the importance of education on climate-sensitive design, since it should be the basis for any design, but too many decades of uniform design solutions across different climates gave poor results in terms of energy efficiency and quality of buildings, so it is necessary to emphasize the importance of these issues.

WHAT?

CONTENT

Climate-sensitive design is a very wide topic, addressing the issues of sustainable design from urban scale to a very detail level including building technologies. Thus, it is necessary to integrate in the curriculum broad range of theoretical principles of climate related comfort issues, as well as numerous case studies which show different scales of applications of climate-sensitive design principles. Learners should be able to detect, through their own analyses, principles which were applied, in different climates, and in problems of different scales (from urban planning issues to technical detailing) which contribute to the better response of built fabric to the climate conditions. In relation to heritage, the main focus of this term is on detecting the mentioned principles in the vernacular heritage.

HOW?

METHODS

Methods of teaching climate-sensitive design should be based on the systematic, integrated and problem-based teaching philosophy. Systematic, because issues of climate related comfort issues need to be the knowledge basis for further sustainability analysis which are the main tool for developing critical thinking on this design principle. Preferred learning environment is therefore knowledge and assessment-cantered. As an elective theoretical course, this subject should provide interdisciplinary knowledge basis for integrating principles of climate sensitiveness into the design process. Through numerous case studies students should develop a method for recognizing these principles in analysed projects. Finally, in a design studio, these principles should be investigated and integrated in the new design concept proposal.

WHY?

GOALS

Teaching climate-sensitive design needs to start with the interdisciplinary, systematic and knowledge-based course. This is where students learn the basis of climate science, comfort issues in buildings in different climates, lessons from vernacular building heritage in these terms and their integration in the contemporary buildings. Students should, through these lessons, learn to recognize design elements which are related to climate sensitiveness, and further practice to detect them through case studies of projects in different climates and of different scale. A very important step in this process is detecting false claims of climate-sensitive project features, undercovering green washing practices. Finally, students should be able to integrate principles of climate-sensitive design into their own project assignments.

TEACHERS' COMPETENCIES

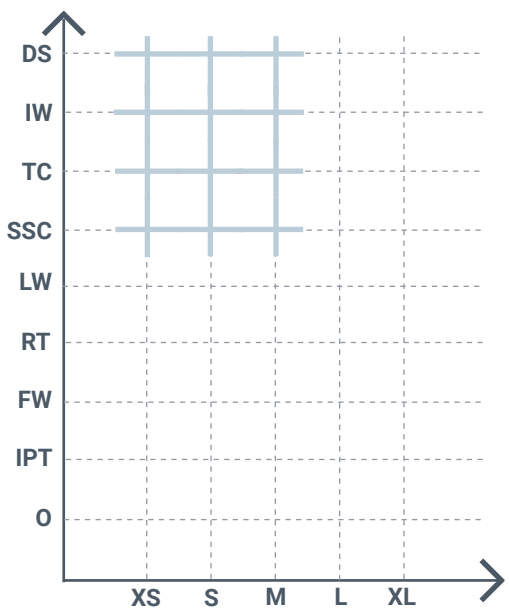
- *Teacher as a knowledgeable expert –bringing experts from disciplines of climate science, building physics and environmental science for building the knowledge basis*
- *the teacher as a lifelong learner – the analysed design approach is highly interdisciplinary and vibrant, so a constant search for new problems, examples and approaches needs to be nurtured*
- the teacher as a classroom actor – encourage students to play detectives in recognizing appropriate design principles in the analysed case studies, revealing common greenwashing elements

COURSE TYPE

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

SCALE

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

- [ ] 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
- [ ] 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:

- [ ] theories of urban design and the planning of communities;
- [ ] the influence of the design and development of cities, past and present on the contemporary built environment;
- [ ] 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:
- Typical solar house *Andromeda*

Authors:
- Vladimir Lovrić

Year (period) of the project
- 1982.

Typical solar house Andromeda, by architect Vladimir Lovrić, was designed in 1982, and since then built in over 100 locations across former Yugoslavia and worldwide. Among the most published examples of build houses are the one built in Belgrade (Višnjička Banja) and Slovenia (Jesenice). Slight variation in the colour of the brick façade gives a different appearance of the same design project. Climate-sensitive design was incorporated through the concept of solar house, designed for moderate climate, maximizing the use of solar energy for passive heating. This design concept is reflected through all design elements: spatial organization, volume, materialization and formal characteristics.

https://www.ekokucamagazin.com/arhitektura/odrziva-arhitektura/

Figure 1. Typical solar house Andromeda, built in Belgrade Belgrade (Višnjička Banja) and Slovenia (Jesenice)
Source: add

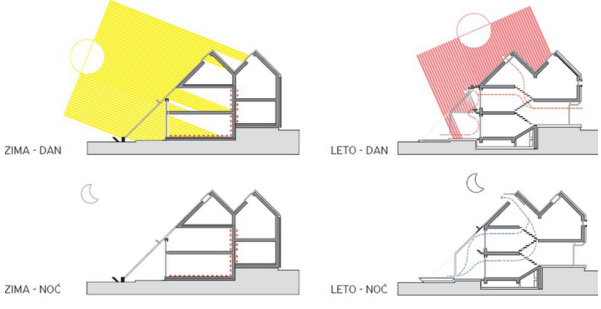


Figure 2. Bioclimatic schemes, winter and summer day/night regime illustrated through typical section
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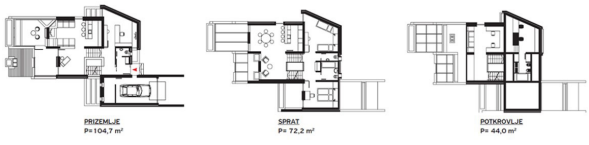

Figure 3. Floor plans
Source: add.

RELEVANT LITERATURE / SOURCES FOR FURTHER RESEARCH

[1] Olgay, Viktor (1963). *Design With Climate: Bioclimatic Approach to Architectural Regionalism.* Princeton, New Jersey, United States: Princeton University Press.

[2] Heschong L. (1979). *Thermal Delight in Architecture.* Cambridge, Massachusetts, USA: The MIT Press.

[3] Oliver P. (1997). *Encyclopedia of Vernacular Architecture of the World*. Cambridge, UK: Cambridge University Press.

[4] Szokolay, S. V. (2008). *Introduction to architectural science: the basis of sustainable design.* Oxford, UK: Architectural Press, Elsevier Ltd.

[5] Hausladen G., Liedl P., De Saldanha, M. (2012). *Building to suit the climate- A handbook*. Basel, Switzerland: Birkhäuser.

[6] Barber D. (2020) *Modern Architecture and Climate: Design Before Air Conditioning.* Princeton, New Jersey, United States: Princeton University Press.