COURSE DESCRIPTION CARD - SYLLABUS

Course name
Adaptation to climate change [S2Arch2E>AdZK]

Course

Field of study
Architecture

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

student has explicit, theoretically based knowledge including the key issues of architecture and urban planning as well as landscape architecture, student has knowledge required for the understanding of social, economic, legal and other determinants outside the engineering field of architectural designing and urban planning, student can acquire information from field specific literature, data bases and other properly selected sources in Polish and English, can integrate the acquired information, interpret the said information, as well as draw conclusions and come up with opinions supported with satisfactory reason, student understands the need for lifelong learning, is aware of the social role of the architect and liability for affecting decisions.

Course objective

Gaining extended knowledge in selected detailed issues of architectural and urban design and the principles of sustainable spatial planning, taking into account the mitigation and adaptation of cities to climate change. Raising awareness of the threats and climatic-environmental, economic and social challenges related to anthropogenic climate change and methods and tools for increasing the resilience of cities, including the role of urban ecosystems. Understanding the latest trends in architecture and urban planning, especially regenerative design and bioclimatic architecture and the integration of spatial planning, environmental protection and water management issues in municipal climate change adaptation plans. Learning about the methods and ways of implementing the latest scientific achievements in architecture and urban planning and fields related to the studied field, including integrated urban water management, eco-hydrology, urban climatology, flood and drought risk management, etc. Preparation for undertaking scientific research.

Course-related learning outcomes

Knowledge:
Student knows and understands:
the role and importance of the natural environment in adaptation activities related to architectural, urban design and spatial planning, and the need to shape spatial order, sustainable development and resilience of cities to climate and environmental changes;
issues related to climate protection and adaptation to climate change - necessary for understanding non-technical conditions of engineering activities and recognizes the need to take them into account in architectural, urban, rural design and spatial planning;
theoretical foundations of scientific reasoning and conducting research in the discipline of architecture and urban planning, and interpretation of research results from other disciplines, including climatology, hydrology and natural sciences;

Skills:
Student can:
recognize the importance of non-technical aspects and effects of the architect's and urban planner's design activity, including its impact on the climate and environment, and take responsibility for technical decisions made in the environment;
recognize systemic and non-technical aspects, including environmental, social, economic and legal aspects in the process of architectural, urban and planning design with a high degree of complexity;
formulate critical analysis statements in the field of architecture, in terms of the impact of development on the environment and climate;

Social competences:
Student is able to formulate and communicate to the public information and opinions on achievements in architecture and urban planning in the field of greenhouse gas emission reduction and adaptation to hydrometeorological extremes;

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The lectures end with an test of knowledge. There are two dates of the test, with the second date being a resit.
Formative assessment
- participation in lectures is not obligatory, but will be rewarded (1 point for each attendance) with points added to the final test result. It is possible to obtain a grade of 5.0 based solely on the test.
- for those willing: the possibility of preparing a short research paper - analysis of adaptive solutions in your own architectural or urban design (additional 0 - 20 points).
Summary assessment:
- assessment from the test covering only the content presented in the lectures. Multiple choice test consisting of 10 questions selected randomly (1-2 questions from each lecture). For each question, you can obtain a maximum of 10 points provided that all correct answers are indicated. The test is passed after obtaining at least 50 points.
Adopted grading scale: 2.0; 3.0; 3.5; 4.0; 4.5; 5.0.
Score and grades: 0 - 49.99 points = F / FX (2.0); 50 - 59.99 points = E (3.0); 60 - 69.99 points = D (3.5); 70

- 79.99 points = C (4.0); 80 - 89.99 points = B (4.5); 90 - 100 points = A (5.0)

Programme content

The lecture content includes: information contained in IPCC reports, scenarios and effects of climate change; issues related to mitigation and adaptation to climate change; specificity of the urban climate and impacts of a city structure on intensification of hydro-meteorological phenomena; ways of increasing the resilience of cities; environmental transformations in the history of urban development and the consequences of urbanization of river basins and valleys; ways of shaping urban waterfronts and flood risk management; protection and regeneration of urban ecosystems; sustainable rainwater management; European and national documents related to climate and environmental protection and urban policy, solutions used in bioclimatic architecture, as well as in adaptation in the development of urban and rural areas.

Course topics

1. Anthropogenic climate change - threats and challenges for cities. IPCC reports, climate change scenarios and effects. Mitigation and adaptation. European climate, environmental and water policies. (3h)
2. Environmental transformations in the history of urban development. Hydrological and environmental consequences of urbanization. Contemporary adaptation challenges. Urban policy. Urban resilience. (2h)
3. Global trends in regenerative and water-sensitive design (water-wise cities, sponge-cities, symbio-cities, biodiver-cities etc.). Ecological, carbon, water footprint. (2h)
4. Ecosystem services. Protection and regeneration of urban ecosystems. The role and perception of wildlife in the city. The importance of wetlands (Ramsar Convention). Restoration processes. Biodiversity (3h)
5. Specificity of urban climate, meteorological phenomena and socio-economic and environmental threats. Urban heat island and heat waves, urban floods. Urban adaptation plans to climate change. (3h)
6. Urban waterfronts and flood risk management. Types of floods and causes of increased flood hazards: hydrometeorological and anthropogenic. Flood risk management strategies. Development in coexistence with water - amphibious architecture. (2h)
7. The role of the river valley in the functional and spatial structure of the city. Causes and effects of degradation of urban streams. Objectives, methods and good practices of urban renewal and nature restoration. Blue-green networks and their role in the structure of the city. Nature-based Solutions. Riverside buffer parks. (3h)
8. Watershed approach in urban planning. "Source - path - receiver" - methods of analysis of surface runoff and water retention capacity. (2h)
9. Urban retention - sustainable rainwater management. SuDS, LID, WSUD, SPRIM. Catalog of forms of surface rainfall retention systems. (2h)
10. Multifunctional urban public space - resilience, inclusiveness, biodiversity, aesthetics. Perceptual and behavioral potential of water in architectural composition - rain squares. (2h)
11. Bioclimatic and symbiotic architecture. Principles, requirements and good practices (2h)
12. Adaptation in rural areas. Flood and drought mitigation. Landscape retention capacity. Land use changes. Land cover and surface runoff. Forest management. (2h)
13. Climate education - the importance of shaping social awareness. Pro-climate activation. Inclusive planning. (2h)

Teaching methods

1. Problem-based lecture with multimedia presentation. Case studies. Inclusive discussion.
2. ekursy.put.poznan.pl (system supporting the didactic process and distance learning).

Bibliography

Basic:
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Climate Adapt, https://climate-adapt.eea.europa.eu/en/knowledge//tools/urban-ast/step-0-1
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An EU Strategy on adaptation to climate change, https://eur-lex.europa.eu/procedure/EN/202557
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Pötz H., Bleuzé P., Urban green-blue grids for sustainable and dynamic cities, Coop For Life, Delft 2012.
Widera, B. (2015). Bioclimatic architecture. Journal of Civil Engineering and Architecture Research, 2(4), 567-578.

Additional:
Addressing climate change in cities. Policy instruments to promote urban nature-based solutions /Błękitno-zielona infrastruktura dla łagodzenia zmian klimatu w miastach - narzędzia strategiczne. https://sendzimir.org.pl/en/publications/policy-instruments-to-promote-urban-nature-based-solutions/
Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32000L0060&qid=1739385787080
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Plany adaptacji do zmian klimatu 44 miast polski. Publikacja podsumowująca. Ministerstwo Środowiska, Warszawa 2018, www.44mpa.pl
Strategiczny plan adaptacji dla sektorów i obszarów wrażliwych na zmiany klimatu do roku 2020 z perspektywą do roku 2030, Ministerstwo Środowiska, Warszawa 2013 Zalewski M., Ekohydrologia. PWN, Warszawa 2020
Ustawa z dnia 18 lipca 2001 r. Prawo wodne (Dz.U. z 2005 r. nr 239 poz. 2019 z późn. zm.)

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00