Course title:	Adaptive systems in the built environment
Course title in Polish:	Systemy adaptacyjne w środowisku zabudowanym
Course for discipline:	civil engineering, geodesy and transport

Semester:	4	**Status of course:**	faculty	**Language:**	english
Academic year:	2026/2027	**Catalog number:**	87/2025/26		

Coordinator of course:	Dr. Anna Piętocha, PhD Eng. Arch.
Lecturer od course:	Dr. Anna Piętocha, PhD Eng. Arch.
Executing unit:	Institute of Civil Engineering
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	This course explores advanced adaptive systems in the built environment, based on energy efficiency and sustainability. It critically examines environmental challenges and enhances doctoral students' sensitivity to environmental protection. Particular emphasis is placed on systems approaches, contemporary technological solutions, and interdisciplinary design in contemporary cities. The course aims to develop doctoral students' skills in analyzing and evaluating adaptation strategies at both the individual (building) and urban (city) scales. Lecture content includes environmental challenges, parametric design, adaptive building envelopes, renewable energy integration, sustainability assessment frameworks, multi-criteria certification of green buildings, and current research directions in adaptive design.
Didactic form, number of hours:	Lectures, 15 hours
Teaching methods:	Traditional lecture, Problem-based lecture, Lectures delivered on-site and via synchronous online platforms
Limit of people in the group:	Undefined

Learning outcomes

KNOWLEDGE - the graduate knows and understands:	**SKILLS - the graduate is able to:**	**COMPETENCES - the graduate is ready to:**
To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	Critically evaluate the achievments in the field/discipline represented
Major general development trends in the field/discipline		Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect
		Support the ethos of scientific circles and conduct independent research

The method of verification of learning outcomes:	Oral presentation supported by multimedia (in-class or online)
Form of documentation of achieved learning outcomes:	Multimedia presentation file (e.g., PowerPoint) and/or recorded presentation
Elements and weights of the final grade:	Class Activity (20%) and Presentation (80%)
Place of the course:	Classroom or online (synchronous)

Basic and supplementary literature

1. Fleming, R., & Roberts, S.H. (2019). Sustainable Design for the Built Environment (1st ed.). Routledge
2. Hensel, M. (2013). Performance-Oriented Architecture. Wiley.
3. Lucas, D. (2021). Ecological Buildings. London: Braun Publishing AG.
4. Malalgoda, C., Amaratunga, D., Haigh, R., et al. (2025). Climate Change Adaptation in the Built Environment: Transdisciplinary and Innovative Learning. Springer.
5. Marchwiński, J. Zielonko-Jung, K. (2024). Współczesna architektura proekologiczna. Warszawa: Wydawnictwo Naukowe PWN.

Comments:	no comments

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	25

Leraning outcomes reference to the second degree characteristics of the National Qualification Framework (level 8) covering doctoral competences:

Symbol:	**Learning outcomes:**	**8 level NQF**
SD1_KW01	To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	P8S_WG
SD1_KW02	Major general development trends in the field/discipline	P8S_WG
SD1_KU05	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	P8S_UW
SD1_KK01	Critically evaluate the achievments in the field/discipline represented	P8S_KK
SD1_KK03	Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect	P8S_KK
SD1_KK08	Support the ethos of scientific circles and conduct independent research	P8S_KR