COURSE DESCRIPTION CARD - SYLLABUS

Course name
User-HVAC interaction [N2IŚrod2-ZwCKiOP>UI]

Course

Field of study
Environmental Engineering

Year/Semester
2/3

Area of study (specialization)
Heating, Air Conditioning and Air Protection

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
8

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Fundamentals of HVAC design and operation. Fundamentals of microclimate analysis of the built environment and indoor environment quality factors. Basic of building physics. Ability to share one's skills with people in a group, understanding the need for continuous learning and updating one's knowledge.

Course objective

Understanding the perspective of users and operators of HVAC systems, that will enable more conscious design of technical building systems.

Course-related learning outcomes

Knowledge:
Knowledge of methods for evaluating the built environment by users.
Knowledge of the problems associated with the use of HVAC facilities.
Knowledge of behavioral theories and scientific concepts describing user-building interaction.
Knowledge of research methods for user-building interaction.

Skills:

The student is able to formulate a research problem in the field of use of HVAC systems.
The student is able to prepare and apply a tool for analyzing problems related to the use of HVAC systems.
The student is able to analyze the results of research and formulate proposals for solving the observed problems related to the use of HVAc system.

Social competences:
Awareness of the user's perspective when designing engineering solutions.
Ability to present engineering issues to their users.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Project: evaluation of the conducted research of the problem related to the use of HVAc systems, taking into account:
- the correctness of the formulation of the research problem,
- relevance of the selected research tool (research method)
- the quality of the prepared research tool,
- the diligence in conducting the research,
- the depth of analysis of the collected data and discussion of the obtained results.

Verification will take place in the presentation of the completed work to the group.

Programme content

Learn and study the perspective of the HVAC user

Course topics

Project:
Discussion of issues in the form of a seminar:
- Behavioral theories and scientific concepts describing user-building interactions.
- Comfort in the built environment.
- Interface of technical building facilities.
- Research methods in the social sciences.
- Contemporary problems of energy systems.
- Post Occupancy Evaluation.

Formulation of the research problem, preparation of the research tool, conducting the study, analysis of the results and presentation of data.

Teaching methods

Project: multimedia presentation and problem-based learning.

Bibliography

Basic:
Occupant-Centric Simulation-Aided Building Design Theory, Application, and Case Studies, red. O'Brien, Tahmasebi, Routledge 2023
IBPSA Education Webinar Series 5
https://www.youtube.com/watch?v=sb8CS1FweA4&list=PLX95PEAoM5YMx8obLsofwsZ4SYsq93VSv
O'Brien, Gunay, The contextual factors contributing to occupants' adaptive comfort behaviors in offices - A review and proposed modeling framework, Building and Environment 179 (2014)
Shove, Gaps, barriers and conceptual chasms--theories of technology transfer and energy in buildings, Energy Policy (1998)
Day et al, A review of select human-building interfaces and their relationship to human behavior, energy use and occupant comfort, Building and Environment 179 (2020)
Heydarian et al., What drives our behaviors in buildings? A review on occupant interactions with building systems from the lens of behavioral theories, Building and Environment 179 (2020)
Hellwig, Perceived control in indoor environments a conceptual approach, Building Research & Information (2015)
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control systems, Energy and Buildings (2013)
Hellwig et al., A framework for adopting adaptive thermal comfort principles in design and operation of buildings, Energy and Buildings (2019)
Routledge Handbook of Resilient Thermal Comfort, red. Nicol, Rijal, Roaf, Routledge 2022
Exploring Occupant Behavior in Buildings, red. Wagner, O'Brian, Dong, Springer 2018

Additional:
Bandurski et al., Zintegrowane wykorzystanie charakterystyki energetycznej budynków w polityce energetycznej, Ciepłownictwo, Ogrzewnictwo, Wentylacja 12/2022
Berger et al., The role of user controls with respect to indoor environmental quality: From evidence to standards, Journal of Building Engineering (2023)
Nagy et al., Ten questions concerning occupant-centric control and operations, Building and Environment (2023)
André et al., Practical differences in operating buildings across countries and climate zones: Perspectives of building managers/operators, Energy and Buildings (2023)
Bandurski et al., Radiators Adjustment in Multi-Family Residential Buildings - An Analysis Based on Data from Heat Meters, Energies (2023)
Haggar et al., Information sharing preferences within buildings: Benefits of cognitive interviewing for enhancing a discrete choice experiment, Energy and Buildings (2022)
Dong, et al., A Global Building Occupant Behavior Database, Scientific data (2022)
Chien-fei Chen et al., Culture, conformity, and carbon? A multi-country analysis of heating and cooling practices in office buildings, Energy Research & Social Science (2020)
Chien-fei Chen et al., The impacts of building characteristics, social psychological and cultural factors on indoor environment quality productivity belief, Building and Environment (2020)
Bandurski et al., The influence of multifamily apartment building occupants on energy and water consumption - the preliminary results of monitoring and survey campaign, E3S Web of Conferences (2017)

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	8	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	17	0,50