



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Klimatsmart arkitektur och urban design Climate Smart Architecture and Urban Design

ABAN15, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED A

Date of Decision: 2023-03-28

General Information

Main field: Architecture with specialization in Sustainable Urban Design. **Depth of study relative to the degree requirements:** Second cycle, has only first-cycle course/s as entry requirements.

Elective Compulsory for: MSUD1, MARK1

Elective for: A4

Language of instruction: The course will be given in English

Aim

The aim of the course is to give students the possibility to explore how an adequate building and urban design can minimize negative impact on the climate. It also aims at supporting students' learning on how the built environment in different climates is affected by the microclimate, vegetation, orientation etc. Moreover the aim is to support the students' learning on how building and urban design affect energy use and daylight in buildings. Moreover the aim is to highlight the impact of people's attitude and behaviour towards climate and energy issues.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- show in-depth understanding of the impact of building and urban design on energy use and climate impact;
- demonstrate knowledge on how the built environment affects wind, solar radiation, temperature conditions and thermal comfort in urban environments;

- demonstrate knowledge about factors which affect thermal comfort, daylighting and energy use for lighting in buildings;
- be aware of how a climate smart design of buildings can minimize the need for heating and cooling and facilitate maximum use of renewable energy;
- be able to formulate criteria for climate conscious and sustainable architecture and urban design.

Competences and skills

For a passing grade the student must

- show the ability to transform knowledge about climate smart architecture and urban design into creative architectonic and urban design which results in a reduction in negative environmental impact;
- show the ability to use tools and models for climate conscious urban design as well as to achieve thermal comfort, low energy use and adequate daylight conditions indoors;
- show the ability to formulate criteria for a climate conscious and sustainable architectonic and urban design.

Judgement and approach

For a passing grade the student must

- demonstrate a critical, independent, creative and innovative attitude to questions regarding climate, energy and architectonic and urban design;
- demonstrate an understanding of how architecture and urban design can support people's sustainable everyday choices about energy use and transport.

Contents

The course deals with the relation between the built environment and climate issues on micro and macro level as well as their relation to energy use. Through creative assignments, it highlights and develops ways to enhance microclimate as well as the potential of renewable energy use such as solar heating and electricity. The course also deals with energy use and daylight conditions in buildings. Using architectural tools, the students will also investigate how innovative and creative urban design solutions can contribute to minimized energy use and prevent negative climate impact.

Examination details

Grading scale: UG - (U,G) - (Fail, Pass)

Assessment: Approved project assignments, active participation at seminars and at least 80% attendance at lectures, supervised exercises and other scheduled activities.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Admission requirements:

- ATHA10 The Theory and History of Architecture II (Year 2) or ATHA25 The Theory and History of Architecture IV (Year 2)
- ATHF01 The Theory and History of Architecture V

- AAHF10 Sustainable Architectural Design
- AAHF01 Sustainable Technology in the Built Environment

The number of participants is limited to: 30

Selection: Completed university credits within the program. Within programmes where the course is given as a mandatory or elective mandatory course students are guaranteed admission. There after priority is given to students enrolled in programmes that include the course in the curriculum.

The course overlaps following course/s: ABA002

Reading list

- Literature will be available through a digital course library, which will be updated annually, as well as the reference literature below.
- Climate and site development, Part 2: Influence of microclimate. Building Research Establishment, 1990, ISBN: 0-85125-429-2. BRE Digest 350.
- Climate and site development, Part 3: Improving microclimate through design. Building Research Establishment, 1990, ISBN: 0-85125-430-6. BRE Digest 350.
- Brown, G. Z.; DeKay, M.: Sun, Wind and Light, Architectural design strategies. John Wiley and Sons Inc, New York, 2001. Second edition.
- Emmanuel, M R: An Urban Approach to Climate-Sensitive Design. Spon Press, 2005, ISBN: 0-415-33410-1.
- Gehl, J: Life Between Buildings, Using Public Space. The Danish Architectural Press, 2001.
- Givoni, B: Climate Considerations in Building and Urban Design. Van Nostrand Reinhold, 1998, ISBN: 0-442-00991-7.
- Glaumann, M; Westerberg, U: Klimatplanering, Vind. Svensk Byggtjänst, 1988, ISBN: 91-7332-371-3.
- Lechner, N: Heating, cooling, lighting, Design methods for architects. John Wiley & Sons inc, New York, 2001. Second Edition. 620 pages.
- Roaf, S; Crichton, D; Nicol, F: Adapting Buildings and Cities for Climate Change, A 21st century survival guide. Architectural Press, Oxford, UK, 2005, ISBN: 0-7506-5911-4.
- Blackmore, P: Wind microclimate around buildings. IHS BRE Press, 2011, ISBN: 978-1-84806-185-9. BRE Digest DG520.
- Erell, E; Pearlmutter, D; Williamson, T: Urban Microclimate, Designing the spaces between buildings. Earthscan, 2011, ISBN: 978-1-84407-467-9.
- Oke TR, Mills G, Christen A, Voogt JA: Urban climates. Cambridge University Press, 2017, ISBN: 978-1-107-42953-6.

Contact and other information

Course coordinator: Erik Johansson, erik.johansson@hdm.lth.se

Course homepage:

http://www.hdm.lth.se/education/undergraduate_courses/aban15_climate_smart_architecture/

Further information: The course is recommended for the master programme Sustainable Urban Design.