UCLouvain

licar2823

2022

Edification soutenable 3 : architecture climatique

3.00 credits	22.5 h	Q2

This biannual learning is being organized in 2022-2023

Teacher(s)	Altomonte Sergio ;Trachte Sophie ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	Part A Background and theories of climate-adapted architecture Sustainable development Part B Advanced heating and cooling systems of buildings Relation between climate-adapted architecture and special building techniques Principles of energetic design in view of the type of building and the type of occupancy, including heat recovery techniques (winter) and natural cooling of buildings (summer) Models of simulation calculations Examples (part A and part B) Research (part A and part B) The course is taught in French
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 Part A - Architecture and sustainable development - critical analysis of architecture in the sustainable development context, using written texts and examples Part B - Advanced special techniques: energetic design of technical installations in relation to energetic design of buildings
Evaluation methods	Preparation of a synthesis article (8000 words), providing a critical and prospective review of the literature and the state of the art in a field of knoweldge relevant to the course (2 people groupwork).
Teaching methods	The course is based on ex-cathedra lectures, workshops, seminars and fieldwork.
Content	Starting from a historical overview of the principles and frameworks related to sustainable development, the module investigates the ways in which scientific research and design practice in architecture and engineering can adequately respond to current and prospected challenges – e.g. climate change, energy crises, demands for comfort, health and well-being in buildings – within a resilient and circular approach to architectural design. The course is articulated on the following contents: • From sustainability to resilience and circularity • Environmental labels and energy certificates • Green buildings vs. healthy buildings • Comfort, health and well-being in buildings • Physics vs Psychophysics: boundaries of tolerance • Methods and tools for environmental design and analysis • Research by design vs Design by research

Bibliography	• Altomonte, S., Allen, J., Bluyssen, P.M., Brager, G., Heschong, L., Loder, A., Schiavon, S., Veitch, J.A., Wang, L., Wargocki, P. (2020). Ten questions concerning well-being in the built environment. *Building and Environment*. doi: https://doi.org/10.1016/j.buildenv.2020.106949 • Altomonte, S., Kent, M., Brager, G., Schiavon, S. (2019). Indoor environmental quality and occupant satisfaction in green-certified buildings. *Building Research & Information*, 47 (3), 255-274. • Altomonte, S., Saadouni, S., Kent, M., Schiavon, S. (2017). Satisfaction with indoor environmental quality in BREEAM and non-BREEAM rated office buildings. *Architectural Science Review* , 60(4): 343-355. • Altomonte, S., Schiavon, S. (2013). Occupant satisfaction in LEED and non-LEED certified buildings. *Building and Environment*. 68, 66-76. • Baker, N., Steemers, K. (2002). *Daylight Design of Buildings*. Earthscan Press. • Cochran, W. G. 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Influence of factors unrelated to environmental quality on occupant satisfaction in LEED and non-LEED buildings. *Building and Environment*. 77, 148-159. • Schittich, C., ed. (2007). *In Detail: Building Skins*. Birkhäuser: Basel. • Schittich, C., ed. (monthly publication). *Detail: Review of Architecture*. Institut fur Internationale Architektur-Dokumentation GmbH & Co. KG: Munich. • Stephan, A., & Athanassiadis, A. (2017). Quantifying and mapping embodied environmental requirements of urban building stocks. *Building and Environment, 114*, 187-202. doi:http://dx.doi.org/10.1016/j.buildenv.2016.11.043 • Stephan, A., & Athanassiadis, A. (2018). Towards a more circular construction sector: Estimating and spatialising current and future non-structural material replacement flows to maintain urban building stocks. *Resources, Conservation and Recycling, 129*, 248-262. doi:https://doi.org/10.1016/j.resconrec.2017.09.022 • Stephan, A., Crawford, R. H., & de Myttenaere, K. (2013). 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Faculty or entity in charge	LOCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	GCE2M	3		🔍
Master [120] in Architecture and Engineering	ARCH2M	3		🔍