

AAR4532+AAR4832 _ aug/dec 2017



FOCUS >> climate as a basis for architectural design



RPBW _ California Academy of Sciences



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Translating data into diagrams informing the design process





Tools



Analogue

digital



MSc Sustainable Architecture _ I semester







Architectual design at the MSc _ Developing integrated solution able to merge structural, functional and environmental systems of the building into a one.



AAR4832+AAR4532 Detailed program



Luca Finocchiaro D NTNU

AAR4832+AAR4532 Detailed program

- U1 _ The architectural potential of climate
- U2 _ Environmental concepts
- U3 _ Climate analysis
- U4 _ Form and thermal balance
- U.5 _ Environmental programming
- U.6 _ Passive Solar heating systems
- U.6 _ Natural ventilation strategies
- U.7 _ The luminous environment
- U.8 _ The thermal envelope:

Advanced materials and components

Learning outcome Main focus of the course is the environmental performance of climate adaptive buildings and their ability to passively create comfortable internal conditions. Thus energy.









Task 1 > Task 2

Analysis > Application

scope _ learning principles and tools

for sustainable architecture while developing competences scope _ defining a meaningfull **design process** based on the understanding of the external environment

CASE STUDY ANALYSES >> ARCHITECTURAL DESIGN



Task 2: studio >> climate adaptation



TASK 2 _ A Mixed - Tower in Marienborg

Bioclimatic design of high rise buildings









Luca Finocchiaro 🖸 NTNU

"increasing the size of a building over a certain measure does not only have **structural** implications but also **environmental** and **functional** ones".

Myron Goldsmith







"I don't think it is how many floors you have. I think it is attitude"

T. J. Gottesdiener, SOM







Task 1ANALYSES Know-how > application DESIGNTask 2



Task 1extracting principles and strategies for bioclimatic designfrom the analysis of relevant case studies









Task 1Internal daylight analyses









AAR4832+AAR4532 Course logistics

Max number of students _ 20 MSc SustArch + 8 Architecture students + 6 structural engineer

Excursion _ London, UK (expected budget 4000kr).

Teaching team: Luca Finocchiaro, Architecture and bioclimatic design Per Monsen, GASA Architects, Oslo Bendik Manum, Architecture and construction Ole Jørgen Bryn, Architecture and construction Gabriele Lobaccaro, parametric modeling and simulation tools

Language: English

Course Start: 29th August





AAR4832+AAR4532 Pensum



- Steven Szokolay, The basis of sustainable design, Architectural press, USA 2008
- o Norbert Lechner, Heating Cooling and Lighting, John Wiley and Sons Inc., USA 2008
- Torben Dahl, Climate and Architecture, Routledge ED.
- o Victor Olgyay, Design with Climate, Princeton University Press, New Jersey 1963

+ articles and material on itslearning



The course on climate and built form at NTNU is part of the Master of Science program in Sustainable Architecture. Inside both theory and design courses students are trained, through **both theory and practice**, in understanding the architectural design of climate adapted buildings as a meaningful process based on the **understanding of the climate** as a source for making architecture.

Theory lectures provide knowledge of climate analysis, architectural design of bioclimatic buildings, energy modeling and tectonics (up to passive house standards). To most lectures correspond a **laboratory** letting students to develop their abilities in computer based energy modeling (simulation tools).

Main focus of the course is the **environmental performance** of climate adapted buildings and their ability to passively create comfortable internal conditions. Thus energy. While **task01** aims at analyzing relevant examples of climate adapted buildings throughout the world, **task02** will focus on the architectural design of energy efficient buildings in cold climatic contexts. In task02 – in 2015 - students will develop six different proposals for the retrofitting and transformation of the power station in Svalbard into a laboratory and research center for global warming and climate analyses accessible to both inhabitants and tourists. Particular attention will be given to the development of integrated solution able to merge structural, functional and environmental systems of the building into a one.

