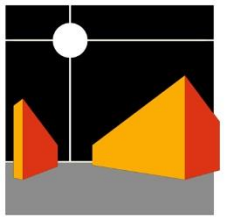
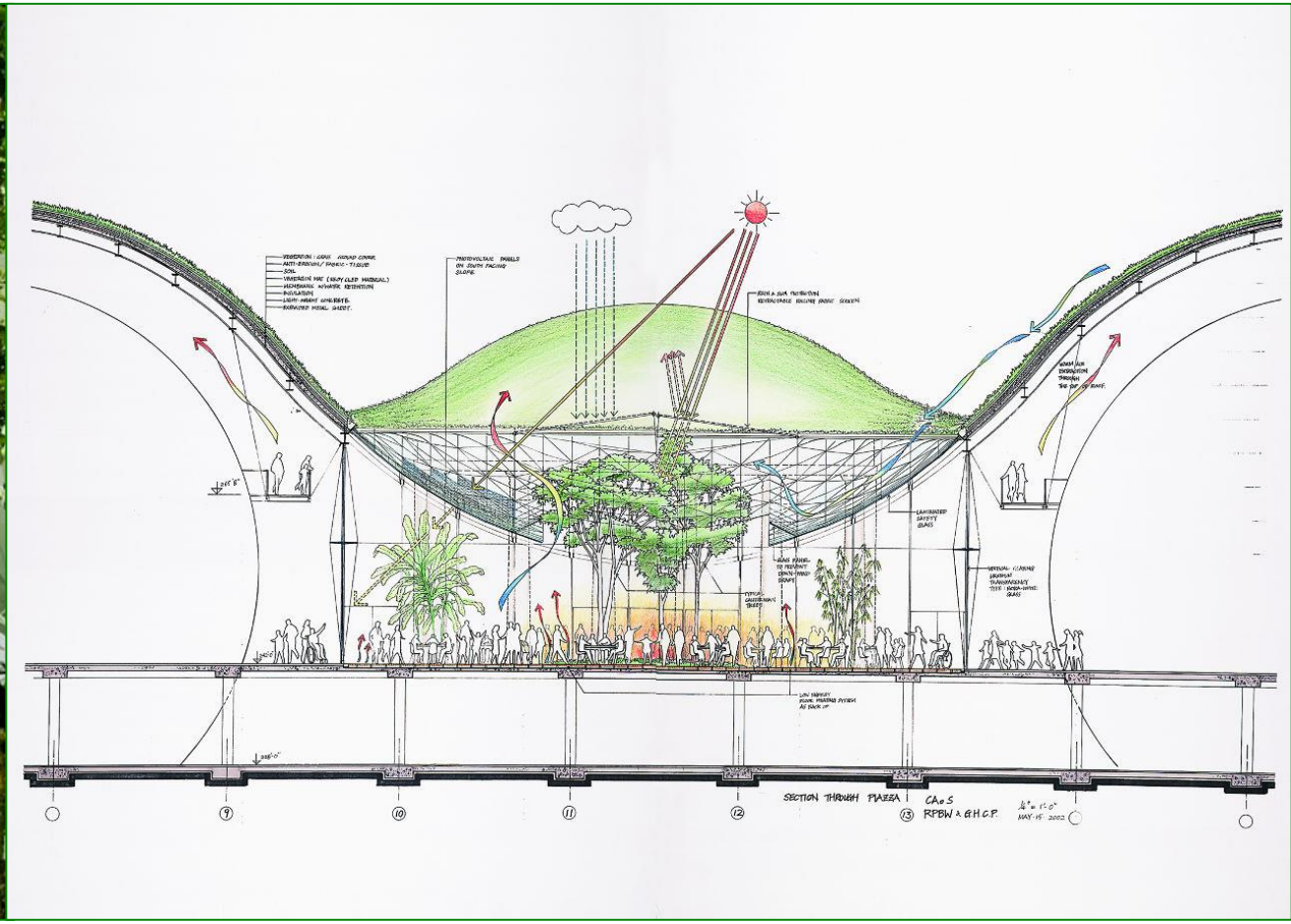


CLIMATE AND BUILT FORMS

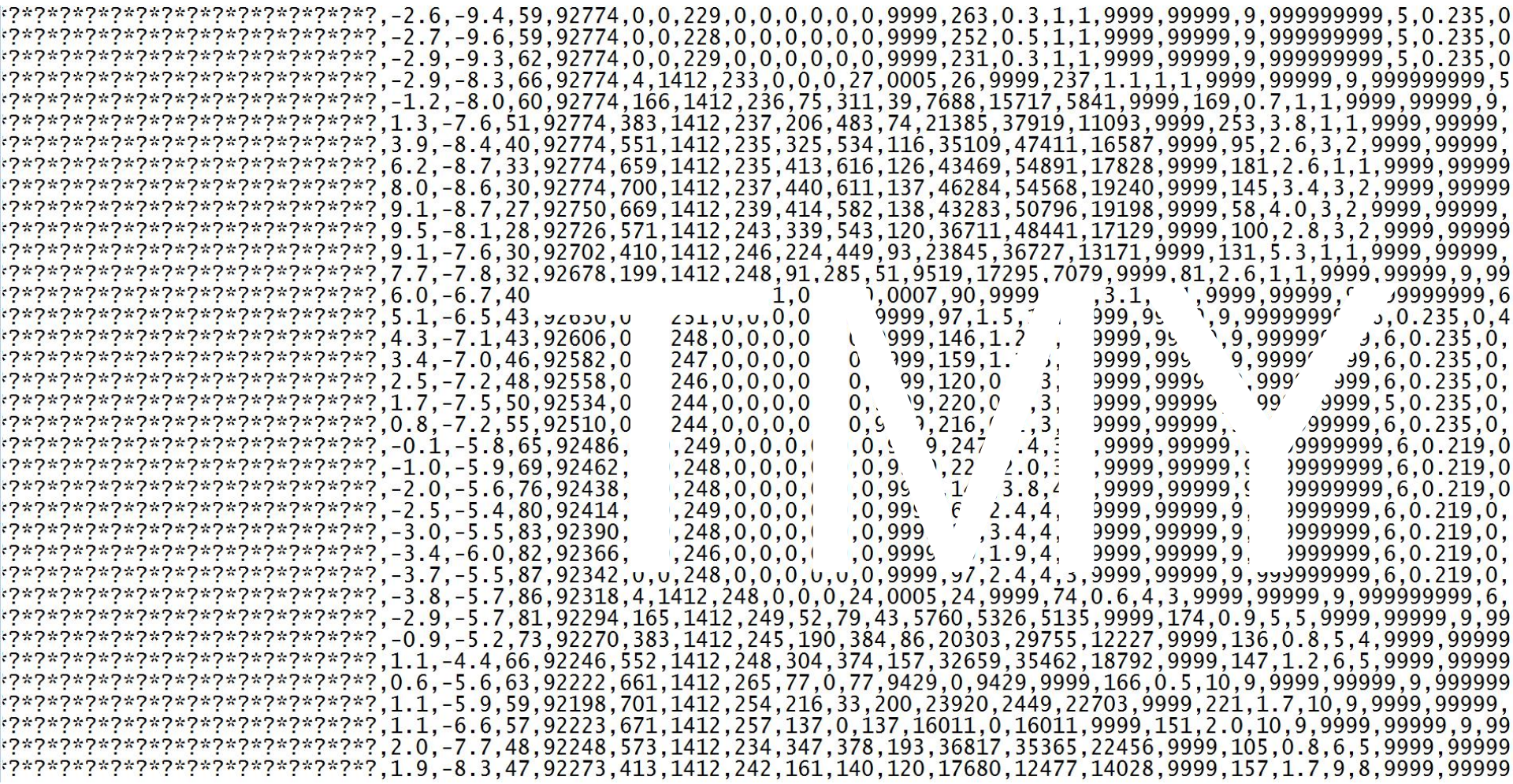
AAR4532+AAR4832 _ aug/dec 2017

Luca Finocchiaro NTNU
Det skapende universitet

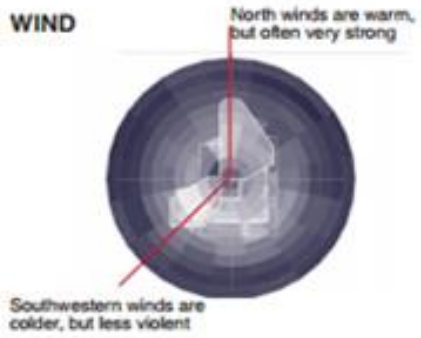
FOCUS >> climate as a basis for architectural design

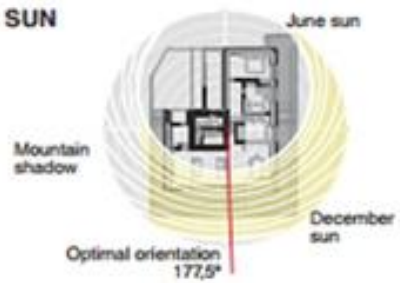


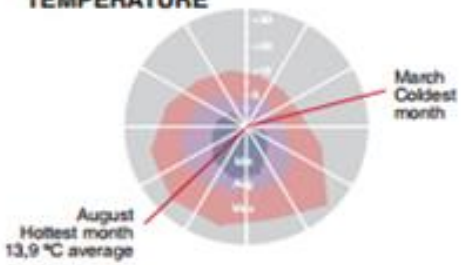
RPBW _ California Academy of Sciences

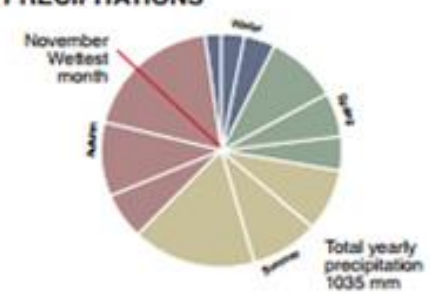


Translating data into diagrams informing the design process

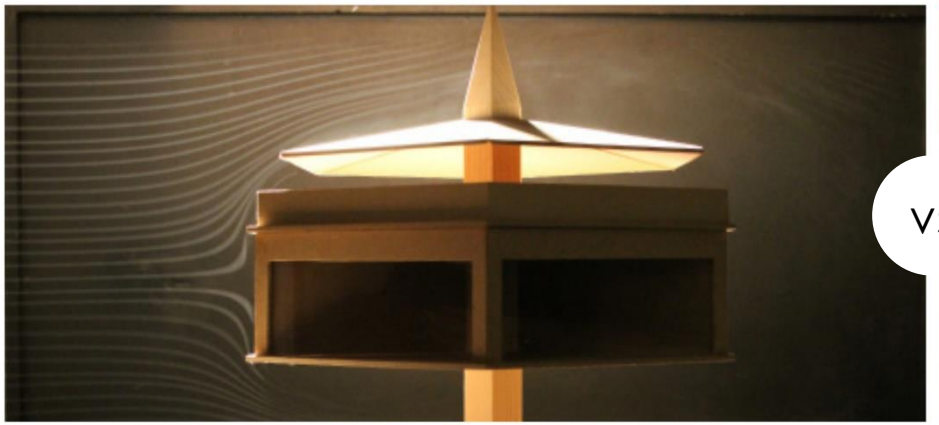




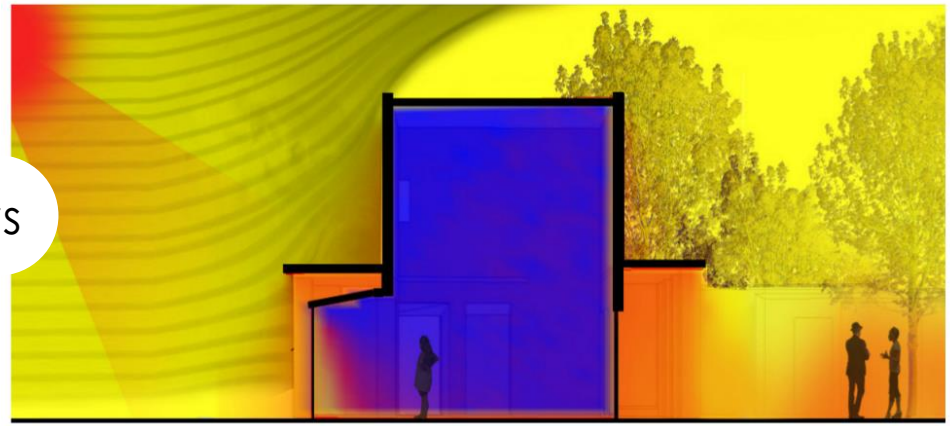




Tools

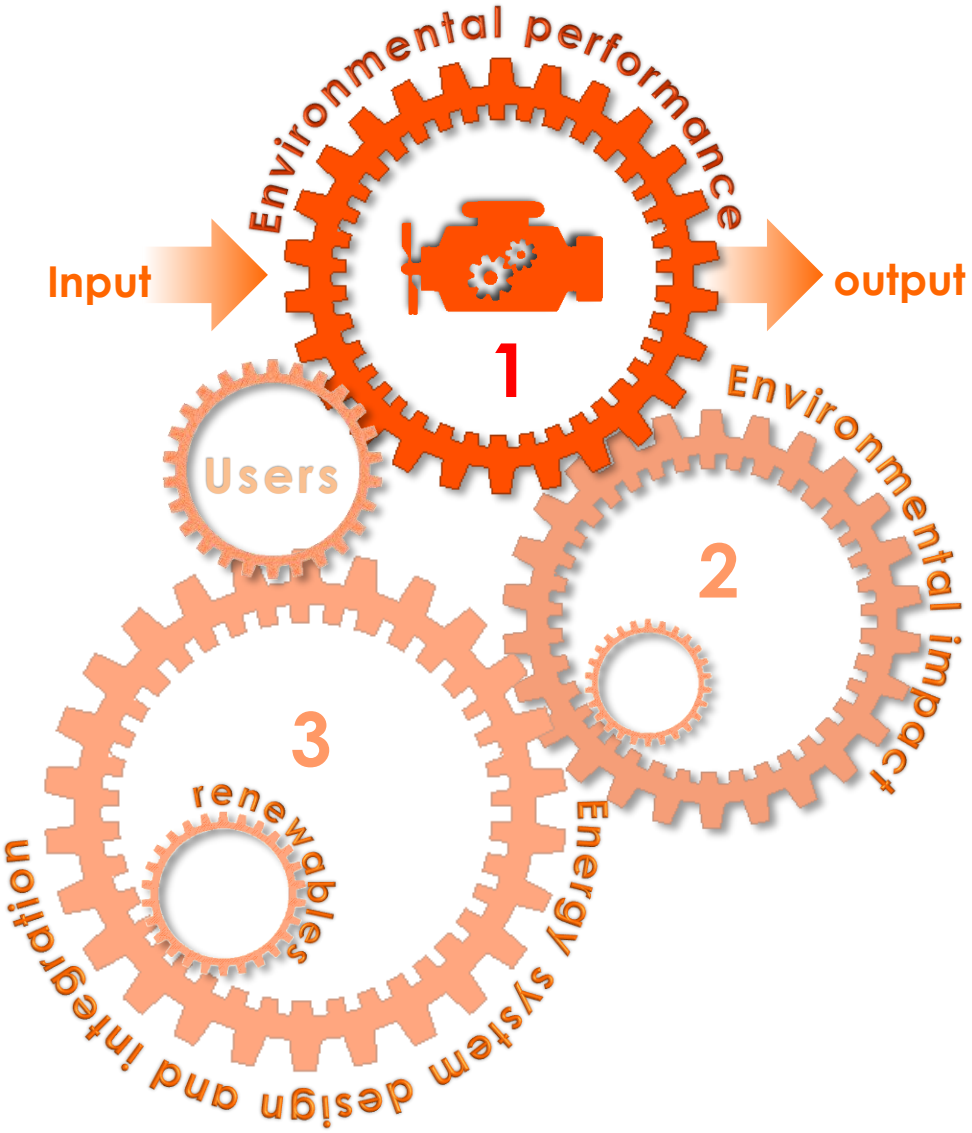


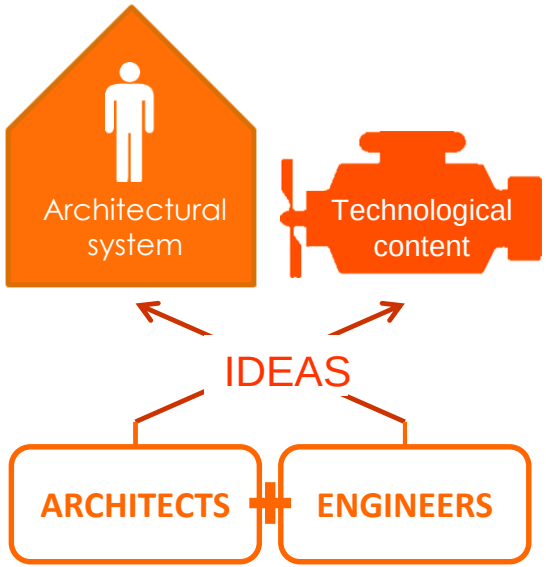
vs



Analogue

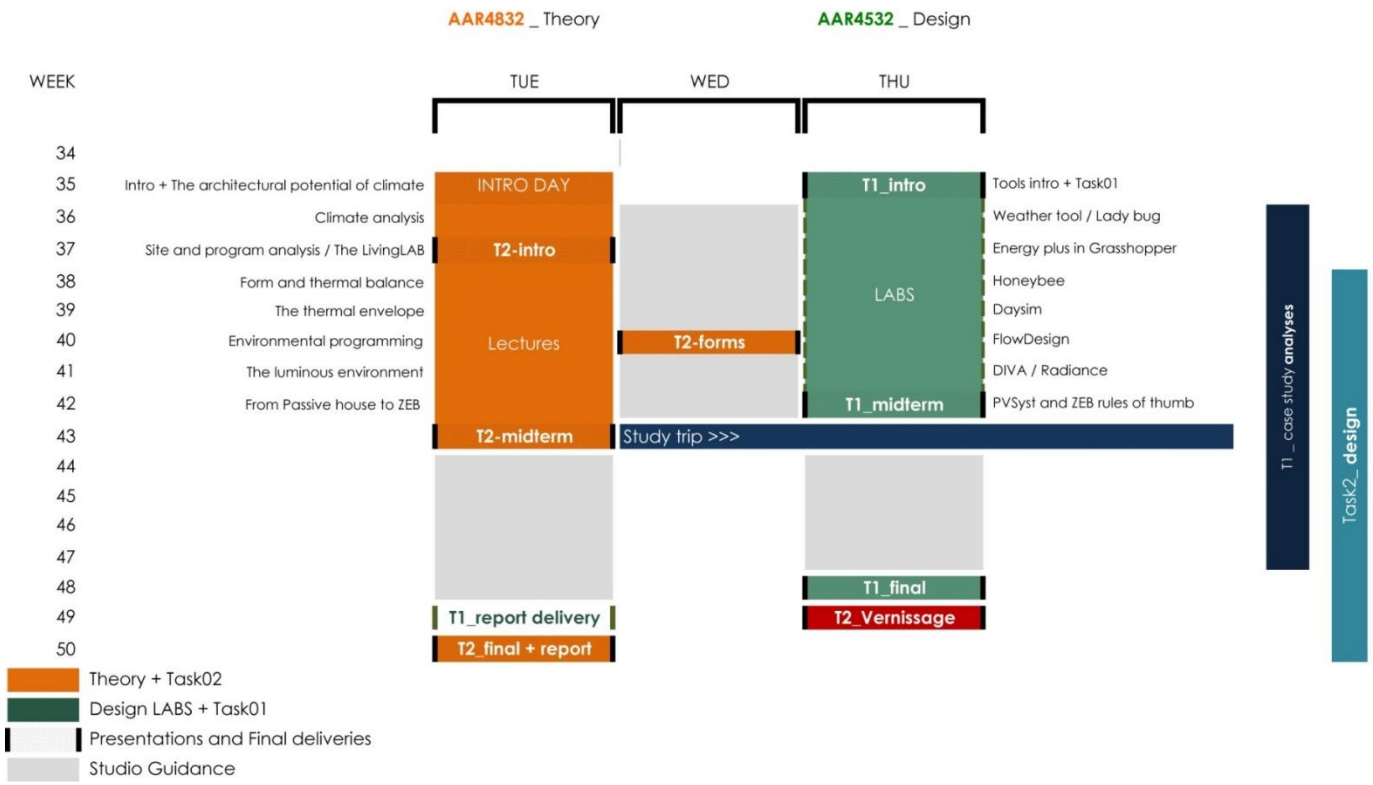
digital


Environmental performance
Input
output
1
Users
2
Environmental impact
3
renewables
Energy system design and integration



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

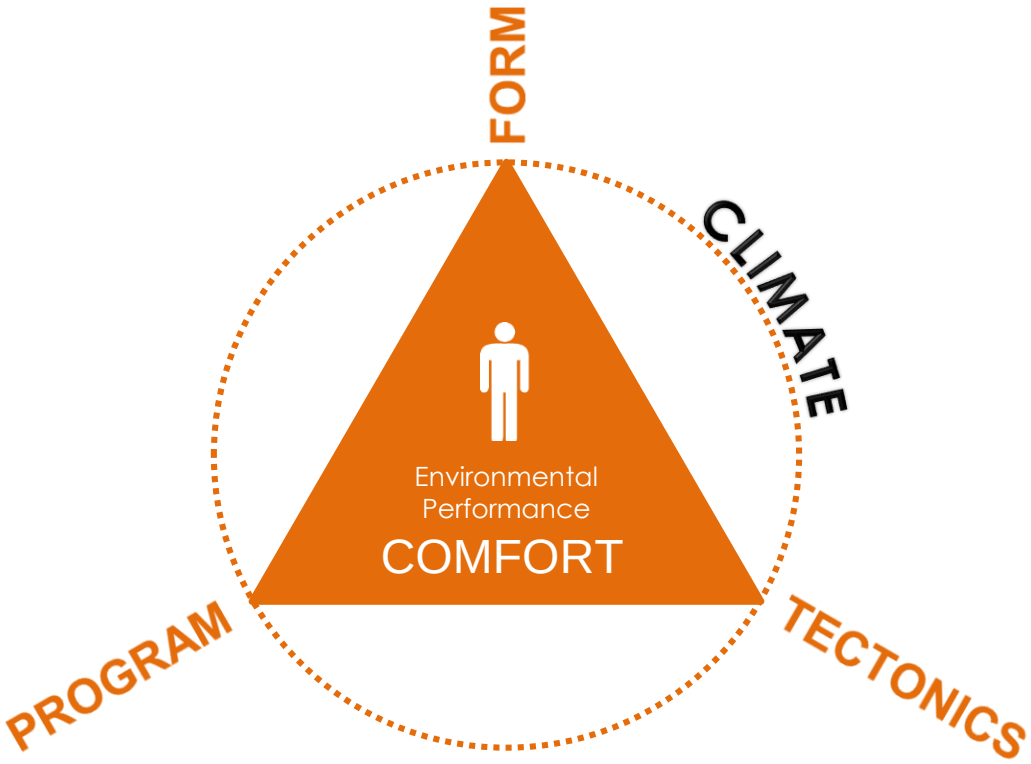


AAR4832+AAR4532 | Detailed program

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.


FORM
CLIMATE
TECTONICS
PROGRAM
Environmental
Performance
COMFORT

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

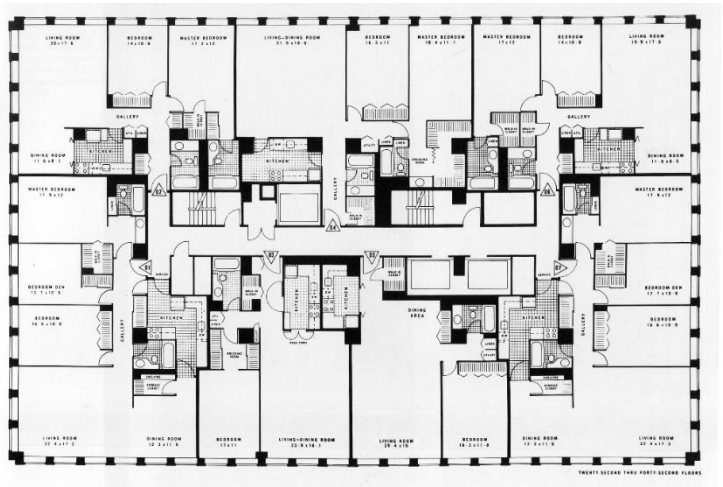
Task 2: studio >> climate adaptation

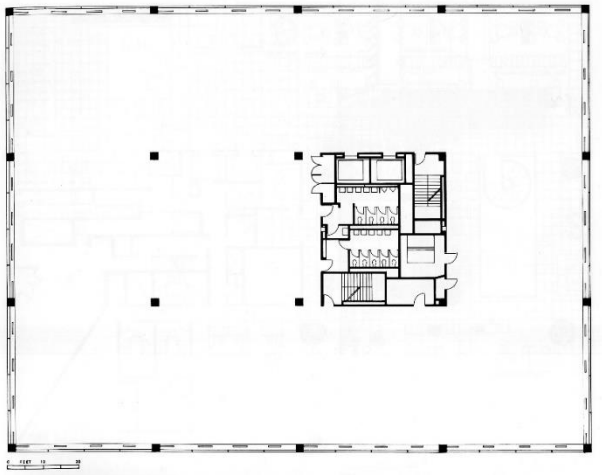
TASK 2 _ A Mixed - Tower in Marienborg

Bioclimatic design of high rise buildings

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

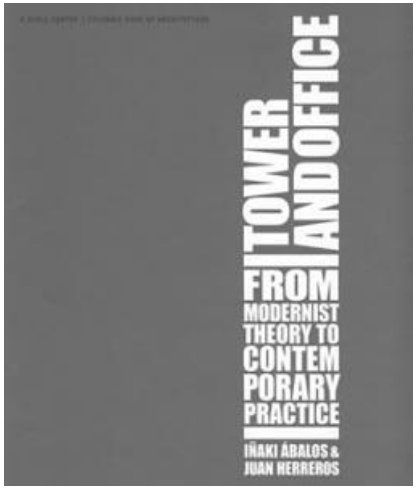
Myron Goldsmith

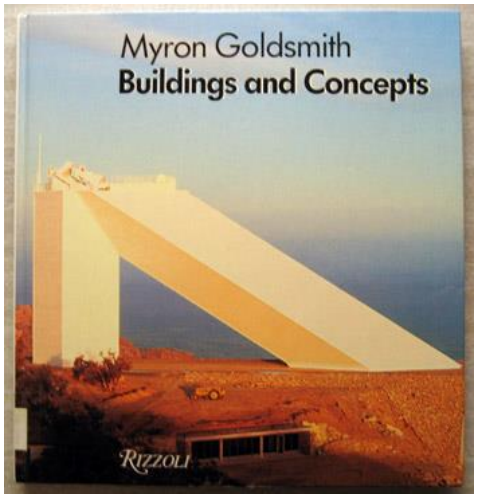




"I don't think it is how many floors you have. I think it is attitude"

T. J. Gottesdiener , SOM


TOWER AND OFFICE
FROM MODERNIST THEORY TO CONTEMPORARY PRACTICE
IÑAKI ÁBALOS & JUAN HERREROS

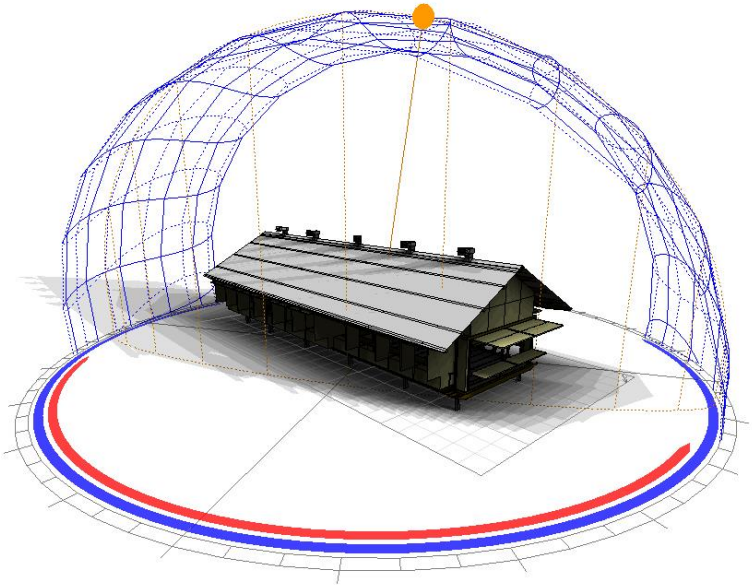

Myron Goldsmith
Buildings and Concepts
RIZZOLI

Task 1 ANALYSES Know-how > application DESIGN **Task 2**

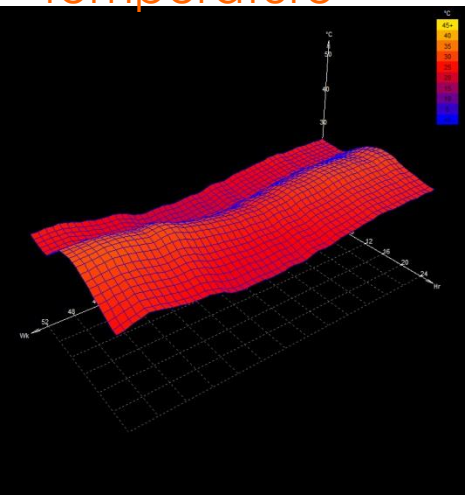
Task 1 | extracting principles and strategies for bioclimatic design from the analysis of relevant case studies

Task 1 | modeling

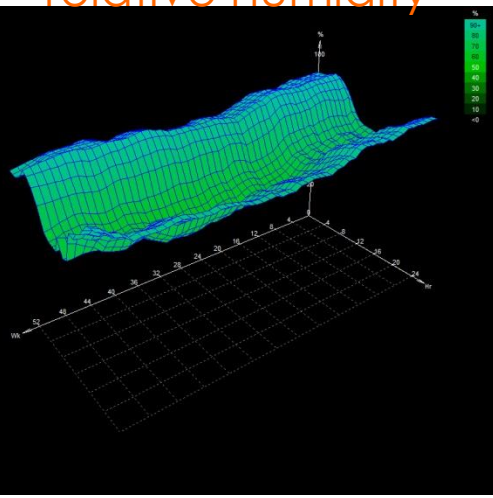
Task 1 | climate analysis and adaptation



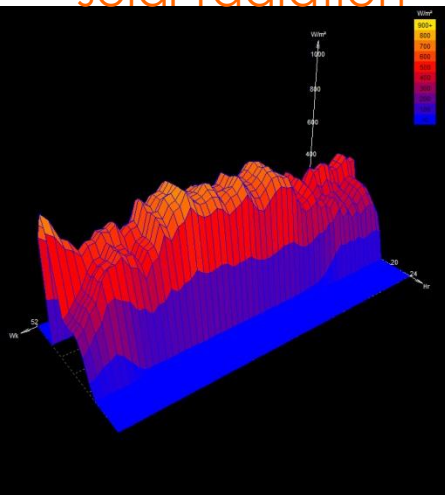
temperature



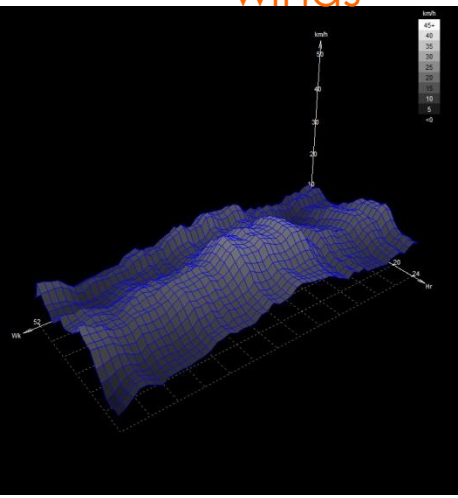
relative humidity



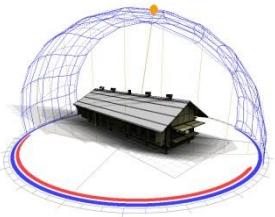
solar radiation

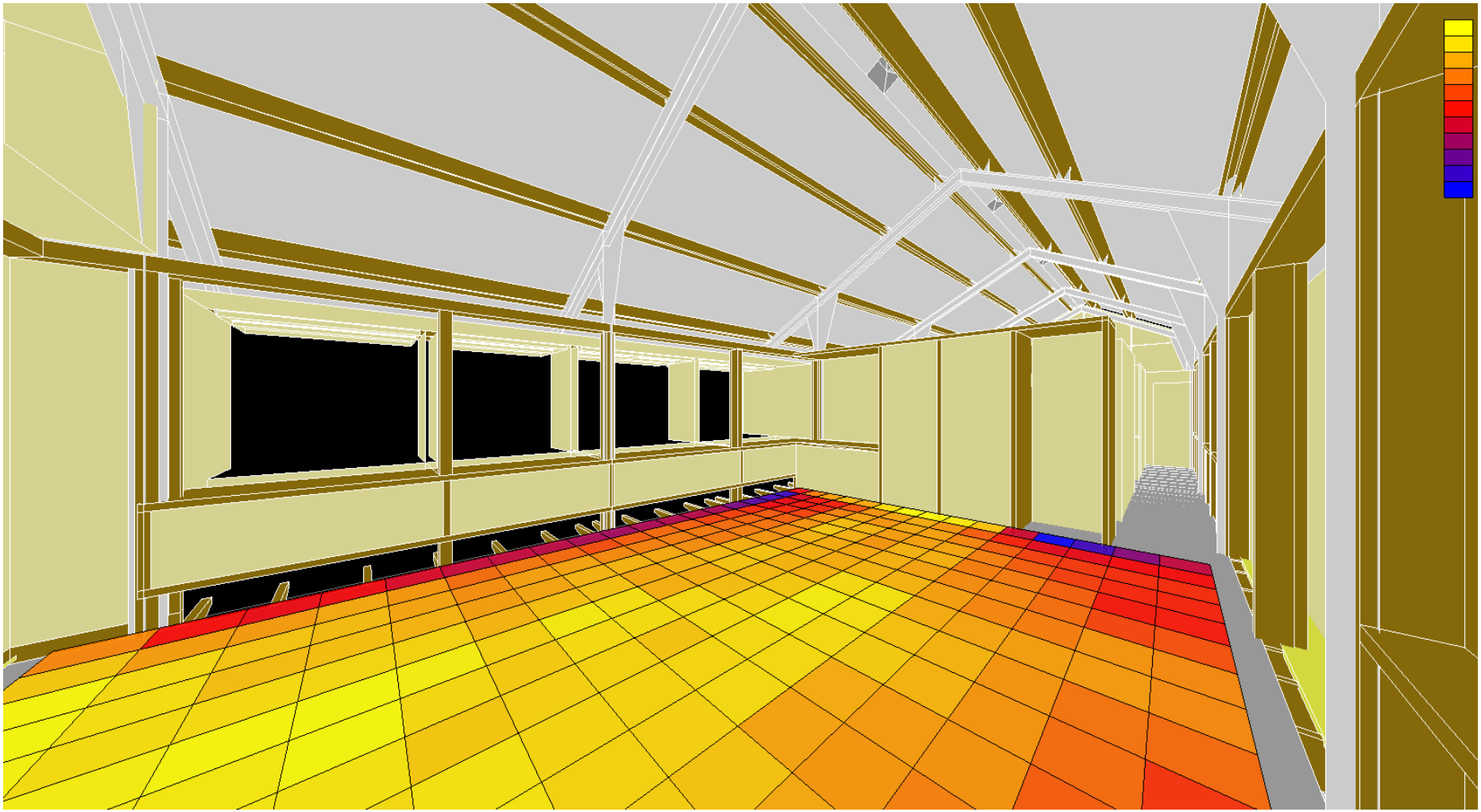


winds

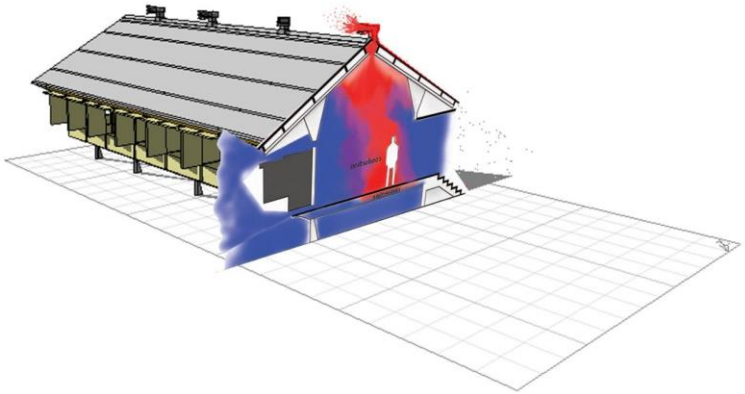


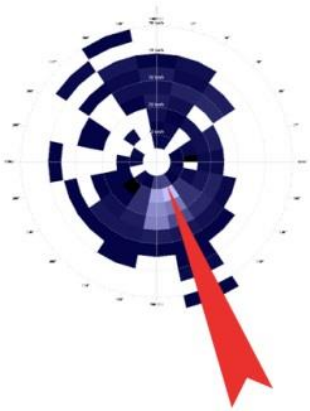
Task 1 | Internal daylight analyses

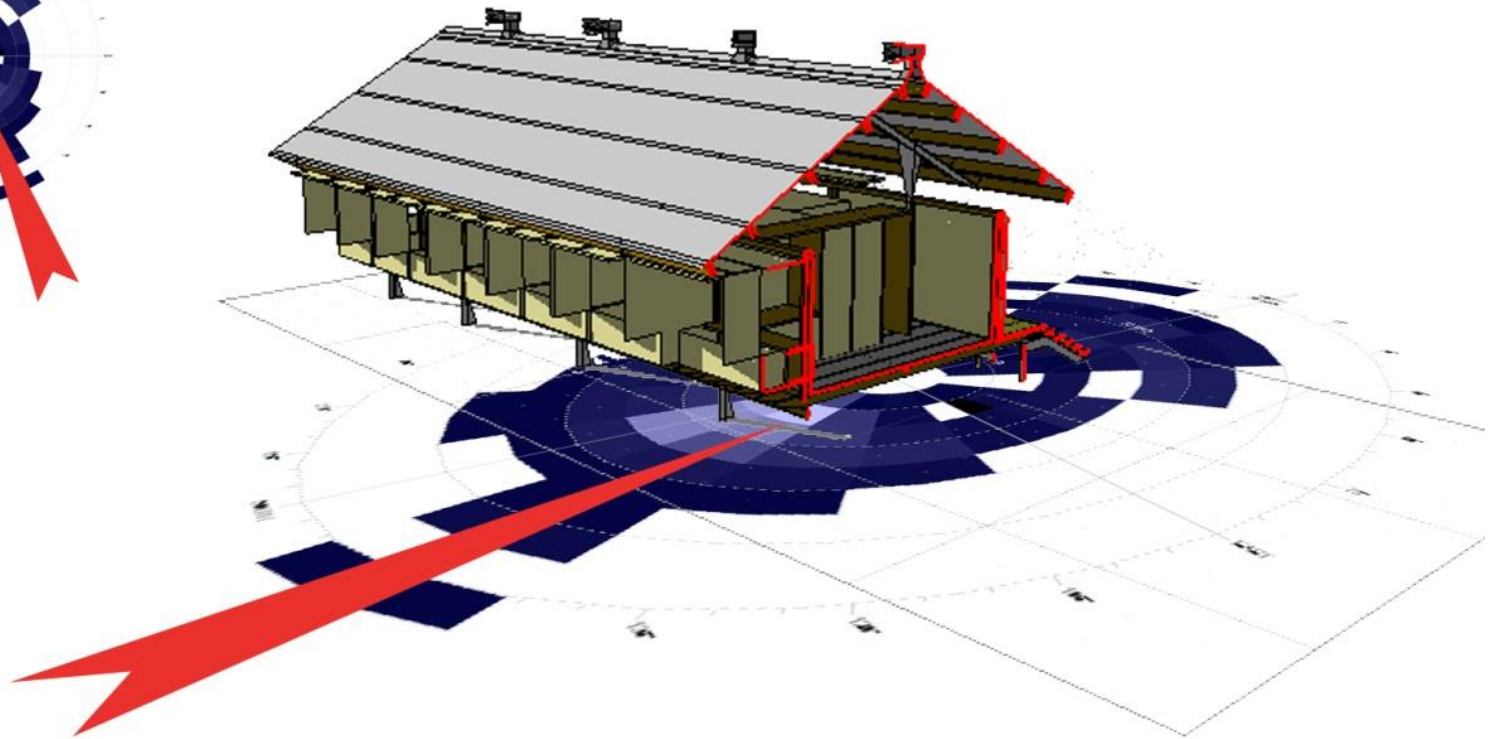




Task 1 | wind analysis







AAR4832+AAR4532 | Course logistics

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

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

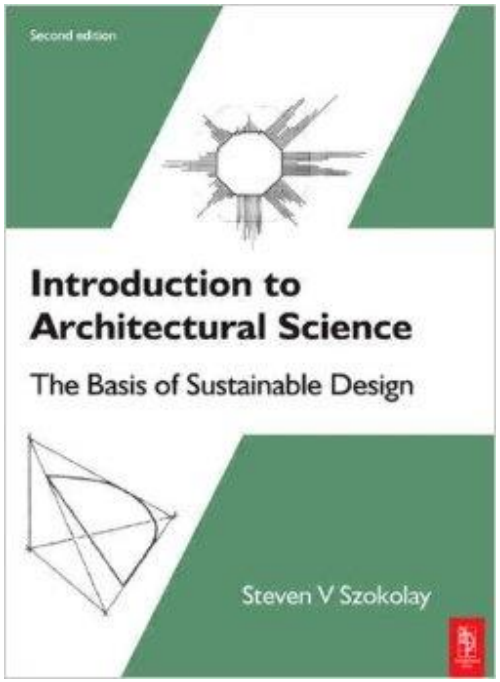
Teaching team:
Luca Finocchiaro, Architecture and bioclimatic design
Per Monsen, GASA Architects, Oslo
Bendik Manum, Architecture and construction
Ole Jørgen Bryn, Architecture and construction
Gabriele Lobaccaro, parametric modeling and simulation tools

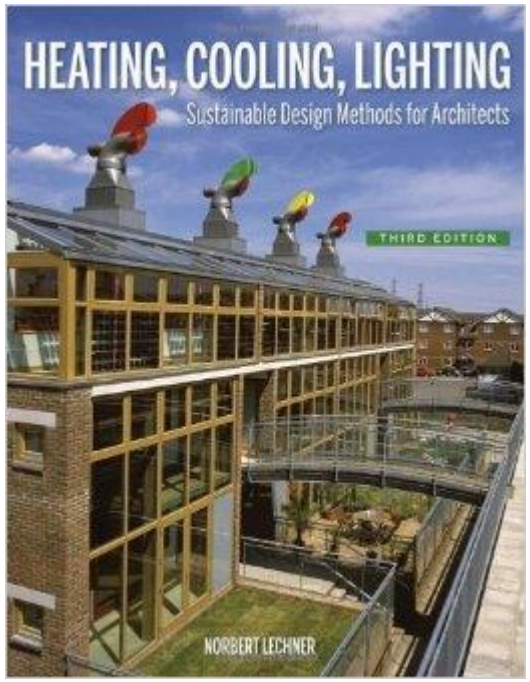
Language: English

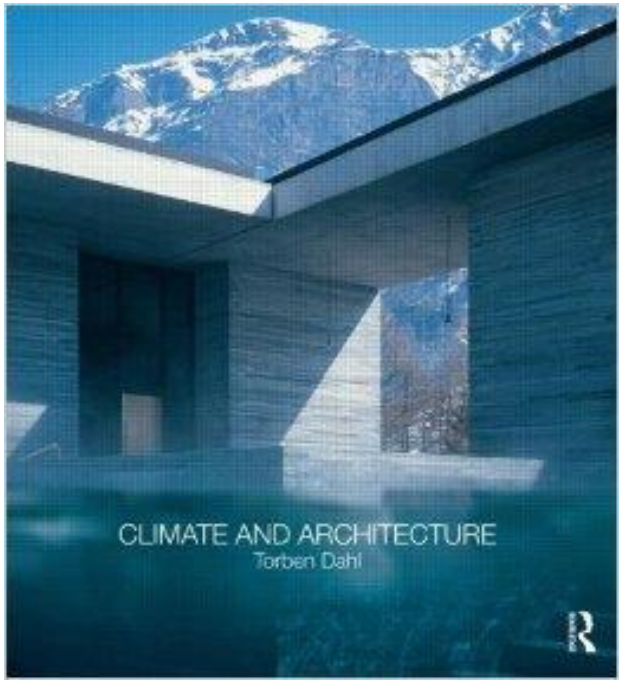
Course Start: 29th August

Partners: NGU Norges geologiske undersøkelse

AAR4832+AAR4532 | Pensum







- Steven Szokolay, The basis of sustainable design, Architectural press, USA 2008
- Norbert Lechner, Heating Cooling and Lighting, John Wiley and Sons Inc. , USA 2008
- Torben Dahl, Climate and Architecture, Routledge ED.

- Victor Olgyay, Design with Climate, Princeton University Press, New Jersey 1963

+ articles and material on itslearning

CLIMATE AND BUILT FORM

AAR4532 + AAR4832

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.