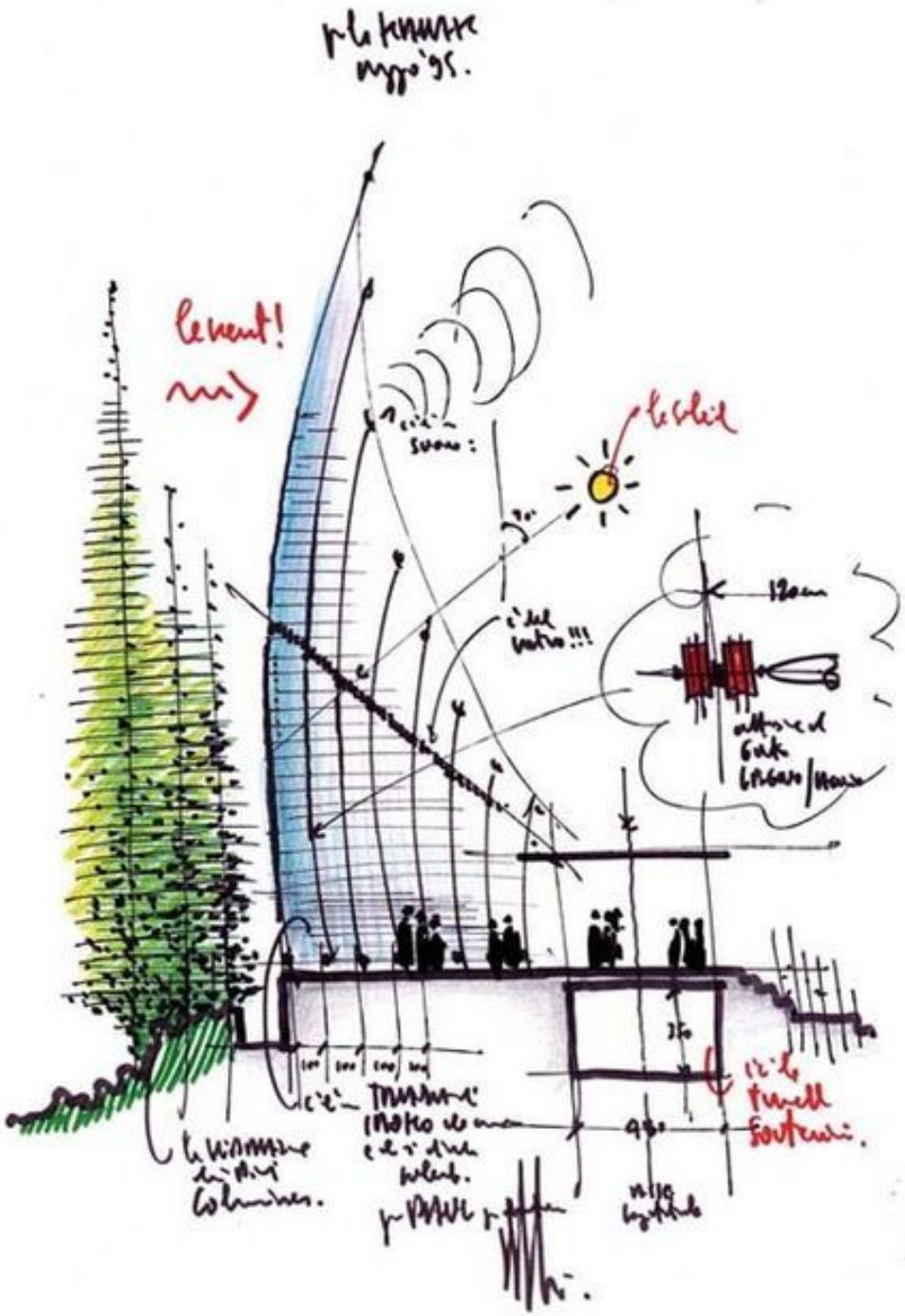


Building Design For Sustainable Architecture

Prof. Michele Morganti

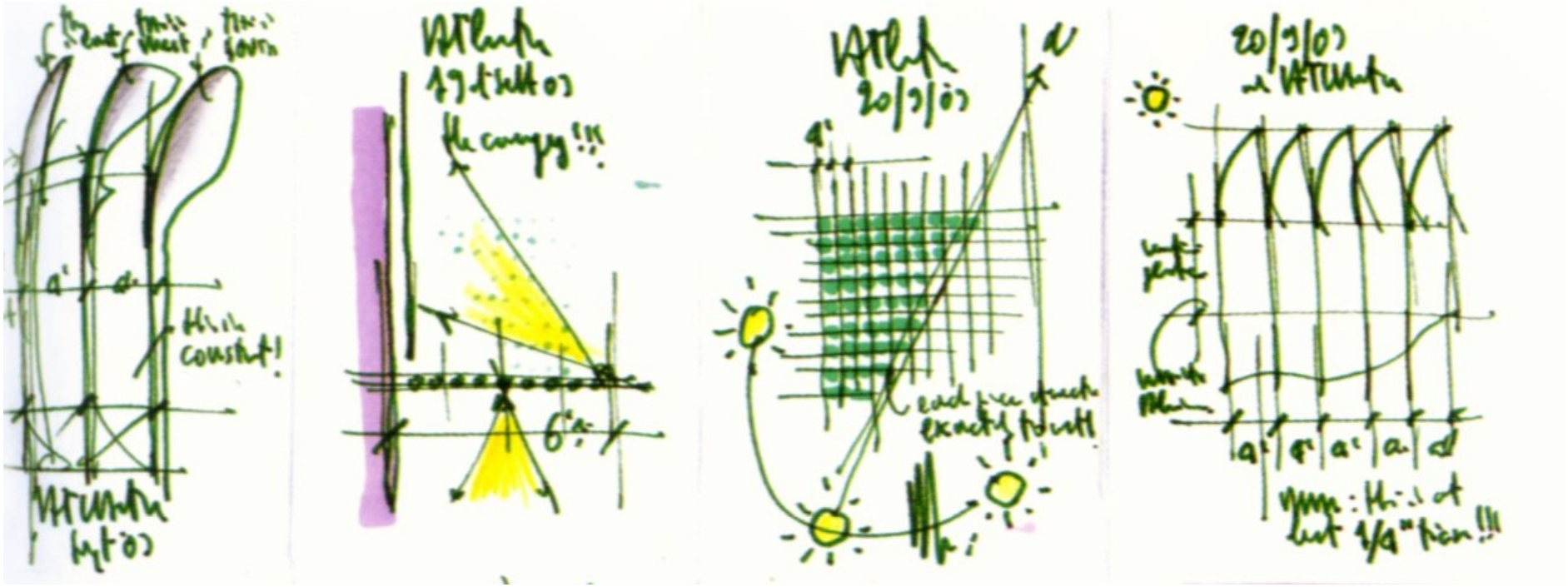
Syllabus 2021/22

Sustainable Building Engineering

SAPIENZA
UNIVERSITÀ DI ROMA

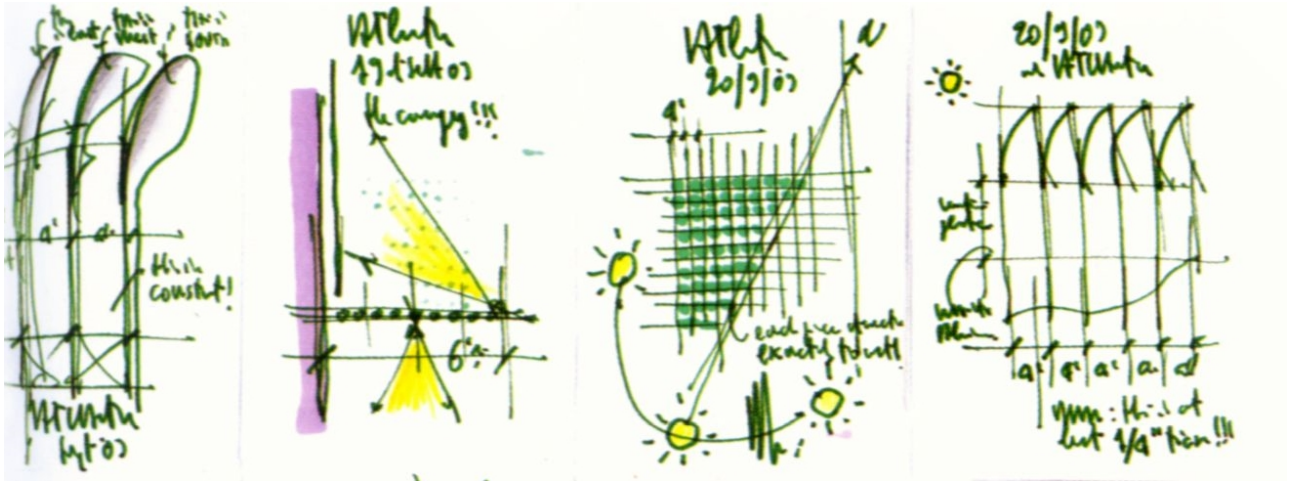
Overview and learning objectives

BD4SA introduces you to the basics of building construction and sustainability, exploring the environmental, economic and social issues that need to be considered for achieving successful building design.



Overview and learning objectives

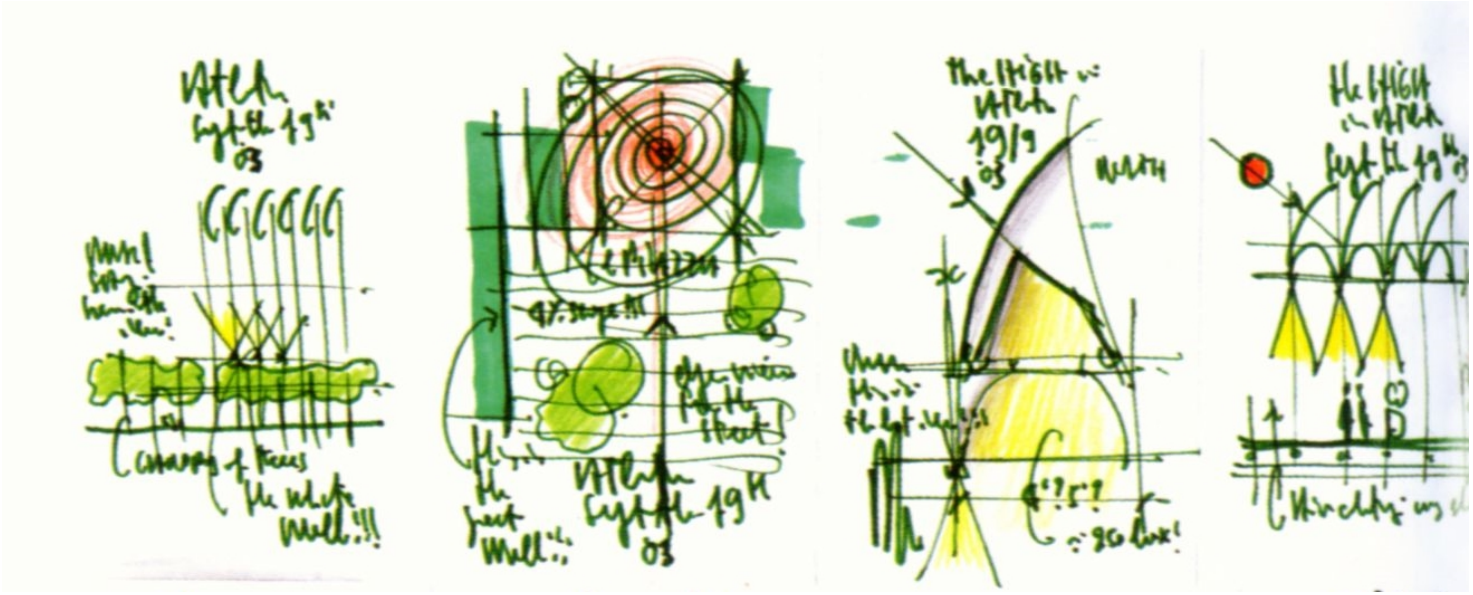
- The BD4SA Course aims to provide a fundamental understanding of the complexity of the sustainable design of a building, from the concept design stage to the detailed design stage.
- It proposes an overview of the relation among climate, architecture and construction and of the various issues that have to be adequately combined to offer occupants a physical, functional and psychological well-being. Students will be guided through the different components, constraints and systems of a work of architecture.
- The course serves as introduction to the key concept of sustainable design, passive strategies construction methods and building materials.
- The body of the Architecture will be investigating skin and bones understanding anatomy of the building through the use of digital modelling.



Outcomes and targets

The Course aims at developing:

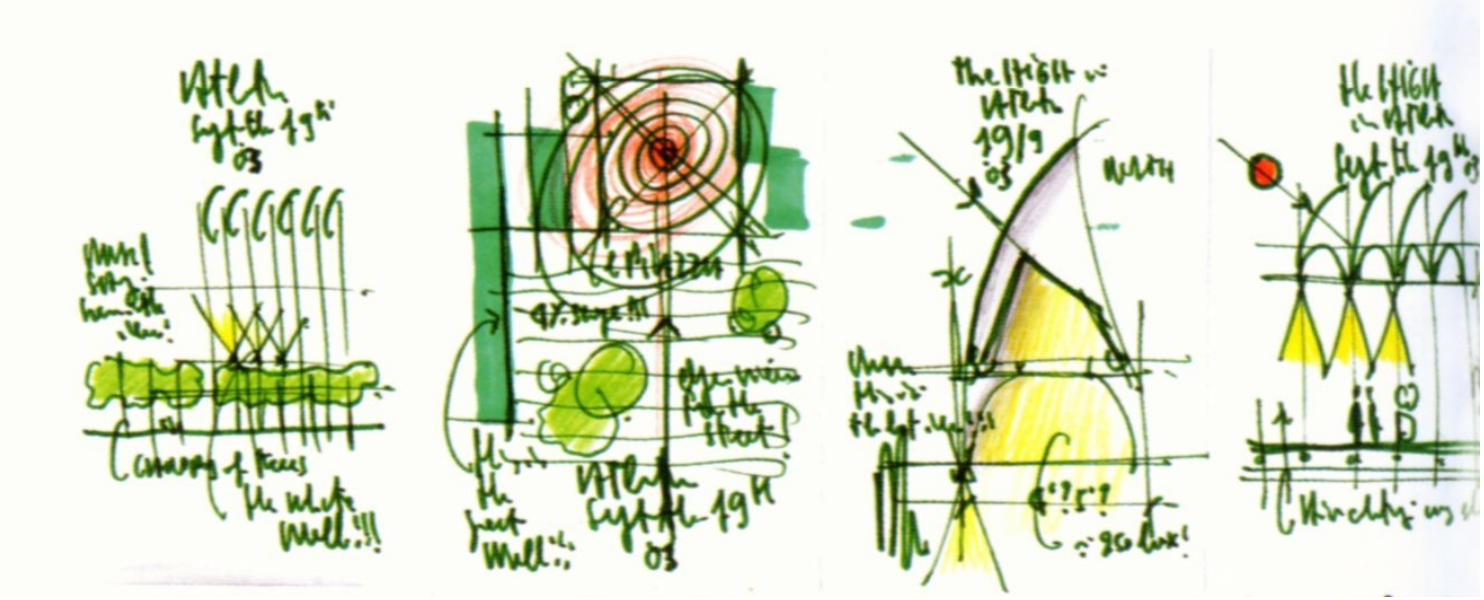
- a cognitive approach in which the historical-cultural, architectural and environmental aspects are conjugated with the ability to recognize and interact with the main parameters characterizing the project area, both in terms of the relationship between environment and present or/and planned building forms, and in terms of the correct understanding of natural resources and physical environment (climate, light, sound, green system, etc.) characterizing the existing context;
- an assessment of the eco-compatibility for the various project options and the best representation methods of design and technological choices;
- theory and practice of sustainable architecture;
- tools and methods of sustainable building design;
- eco-friendly building technologies and materials.



Outcomes and targets

The skills that the student must acquire are addressed to:

- the relationship between existing site and new design parts, the interaction between microclimate, building and open space;
- the definition of a building, whose design choices, must descend from a design process aware of relationships between functional, constructive and linguistic aspects along with specific attention to the bioclimatic approach and to the aspects of energy efficiency and quality of the environment, thermo-hygrometric and lighting;
- carry out design activities with an integrated and multi-disciplinary approach;
- solve complex problems from a multidisciplinary perspective, in particular, the sustainable transformation of natural and built environment, and quality of architecture related to environmental and building sciences.



Educational structure

Fig. 2.13
ROME – ATRIUM HOUSE

Fig. 2.14
TURKEY – COUNTRY HOUSE

Fig. 2.15
FANØ – RECTANGULAR-SHAPED HOUSE

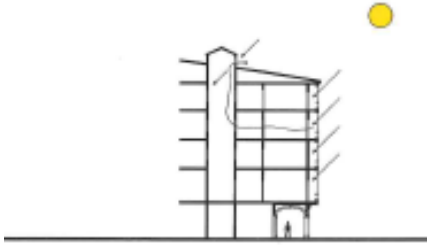


Fig. 2.16
LA CORUÑA – TOWN HOUSE

BD4SA is based on lectures and design activities, essential to acquire the ability understand and control the interaction among climate, building, construction methods and building materials.

Learning activities are configured as follows:

- Lectures and practical seminars;
- Design studio with tutoring; the design work will be organized in small groups of 3 students.
- Homework assignments concerning practical applications on the contents of the lectures.

Assessment and grading criteria

The Design Studio implies a **regular participation** that will lead to individual judgment.

The activities will be monitored through **interim evaluation**: **milestones** in the development of the overall final design. At each milestone, works are presented to all Studio members (tutors and students, invited external critics).

At the end of the design studio, the work will be collectively presented, discussed and assessed.

The exam will be characterized by a compulsory oral exam, the individual assignments, the group design development and individual insights at the scale of construction and as built design.

Grading criteria:

60% Design studio

(completeness and quality)

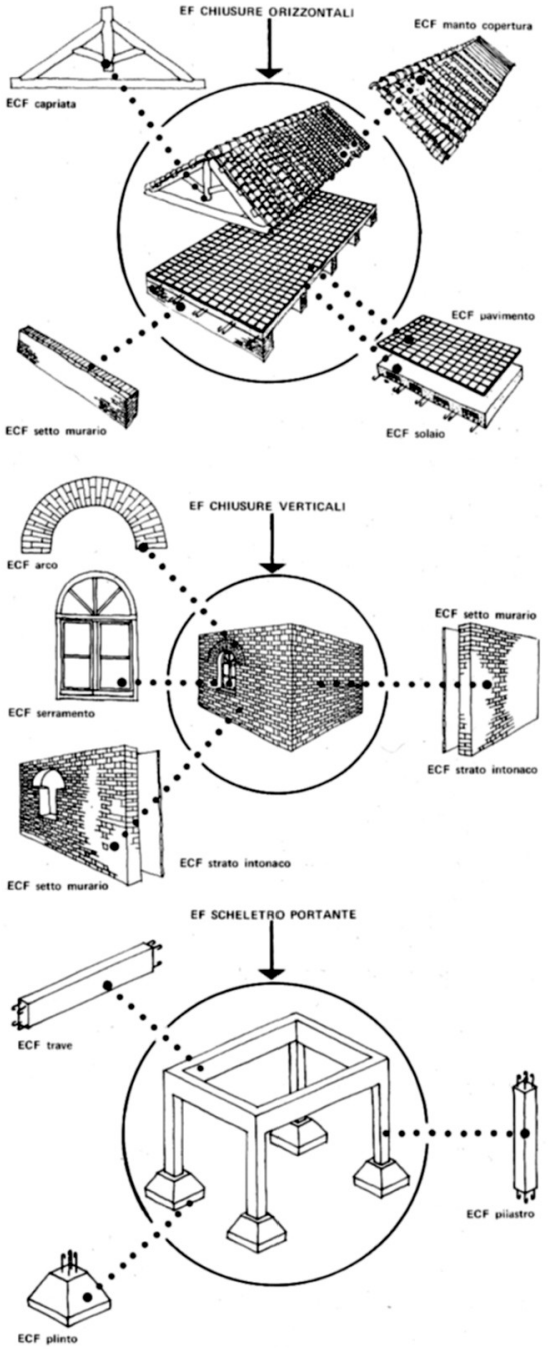
40% Theoretical part

(lectures, seminars and readings)

Lectures

BUILDING CONSTRUCTION

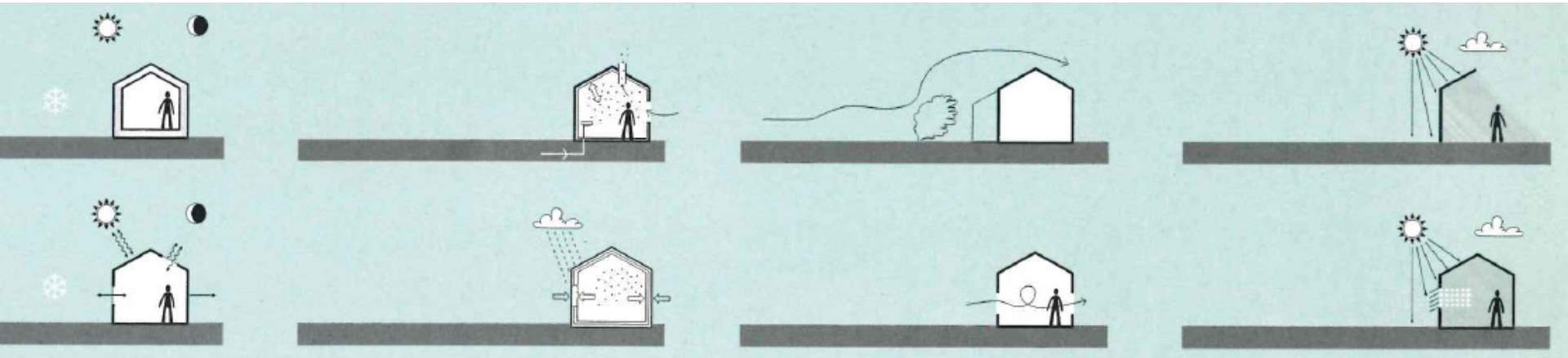
- Building anatomy (components analysis)
- Architecture and structural support; introduction to building construction systems (spoiler)
- Architecture and structural support: stereotomy and tectonics
- Foundations
- Walls
- Floors
- Roofs
- Moisture and thermal protection in the building envelope



Lectures

CLIMATE AND ARCHITECTURE

- Place and climate: the architectural potential of climate
- Human body and human comfort
- Adaptation and control: traditional climate-adapted architecture
- Climate themes 1: hot and cold
- Climate themes 2: humidity and precipitation
- Climate themes 3: wind and ventilation;

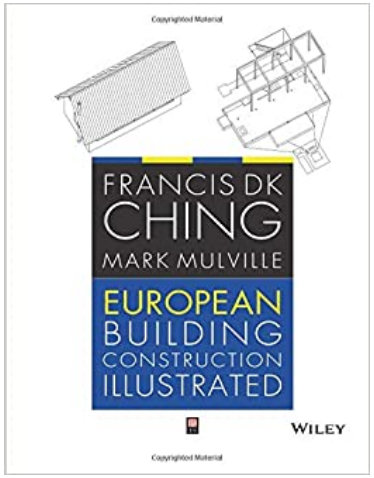


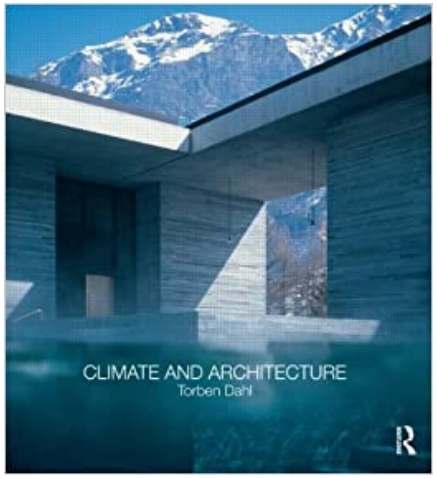
Reading materials

Textbooks

- Francis DK Ching and Mark Mulville, European Building Construction Illustrated. John Wiley & Sons Ltd, 2014
- Torben Dahl, Climate and Architecture. Routledge, 2010

- **Specialized journals**: Detail, Arketipo, The Plan, El Croquis, The Architectural Review

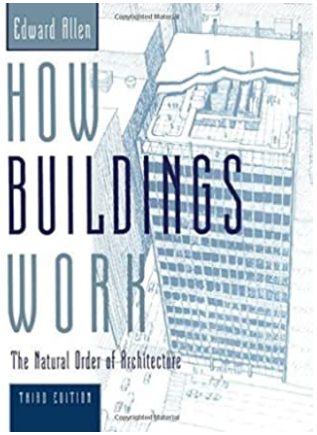


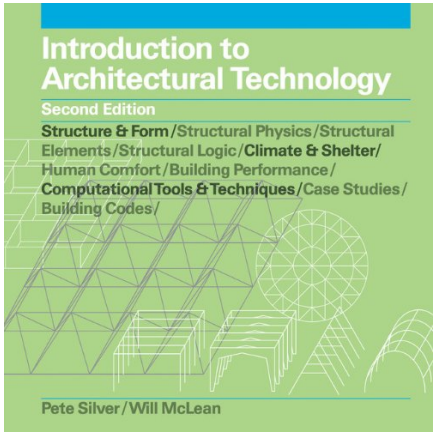


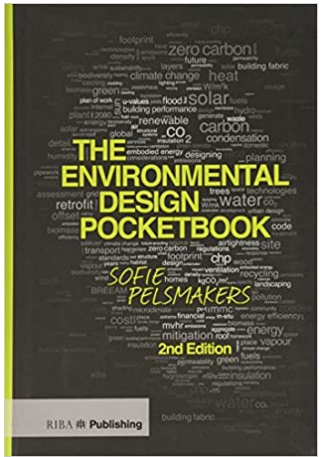
Readings

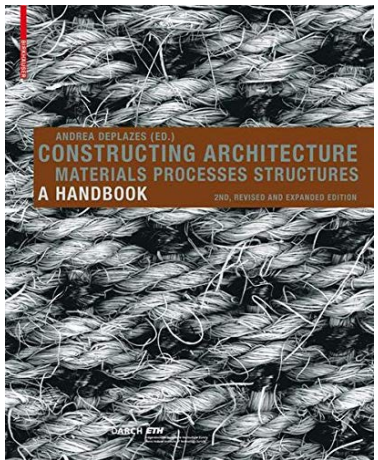
- Edward Allen and David Swoboda, How Buildings Work: The Natural Order of Architecture. New York, NY: Oxford University Press, 2005.
- Deplazes, Andrea. Constructing Architecture. Basel, Switzerland: Birkhäuser, 2006.
- Silver, Pete; Whitsett, Dason; McLean, William. Introduction to Architectural Technology, Edition: 2nd ed. London [U.K.] : Laurence King Publishing. 2013. eBook
- Allen, Edward, and Joseph Iano. Fundamentals of Building Construction: Materials and Methods. New York, NY: John Wiley & Sons, 2003.
- Sofie Pelsmakers, The Environmental Design Pocketbook, RIBA Publishing; 2 edition (1 Jan. 2015)

Additional teaching materials will be provided during the semesters.









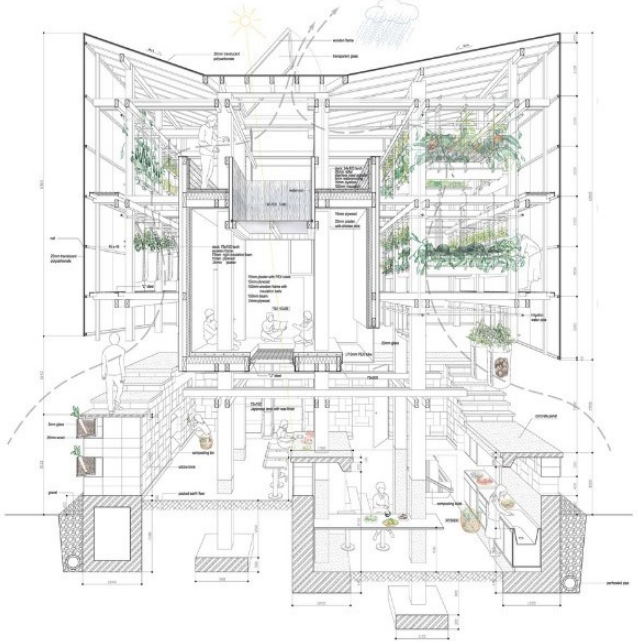
E-learning official Google Classroom

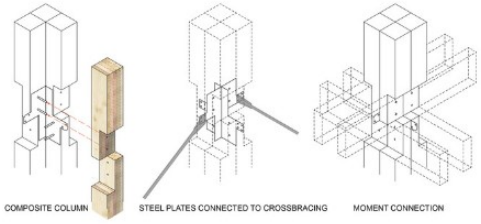
Course code

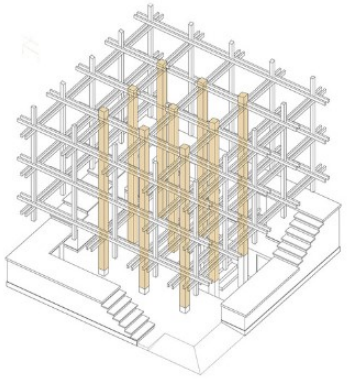
ttudj36

Invitation link

https://classroom.google.com/c/Mzg4NTM5MDM2MjEx?cjc=ttudj36







Official public links

https://corsidilaurea.uniroma1.it/it/users/michelemorgantiuniroma1it

Web sources: few examples

DETAIL inspiration

https://inspiration.detail.de/startseite.html?lang=en

de zeen

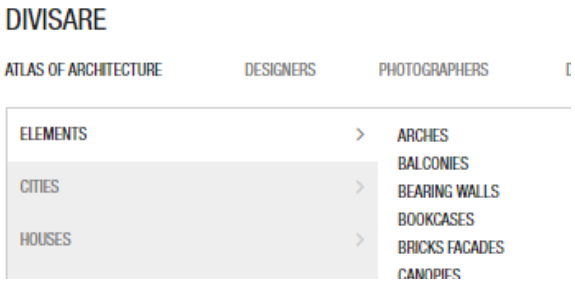
http://www.dezeen.com

arch daily

the world's most visited architecture website

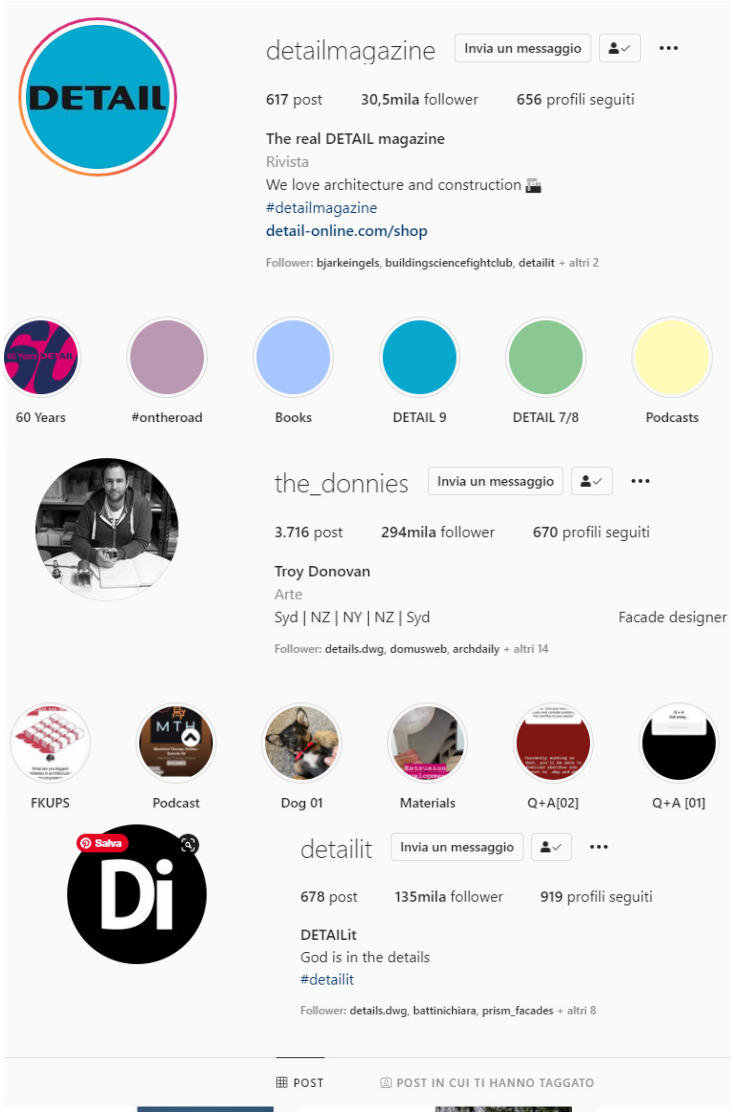
http://www.archdaily.com

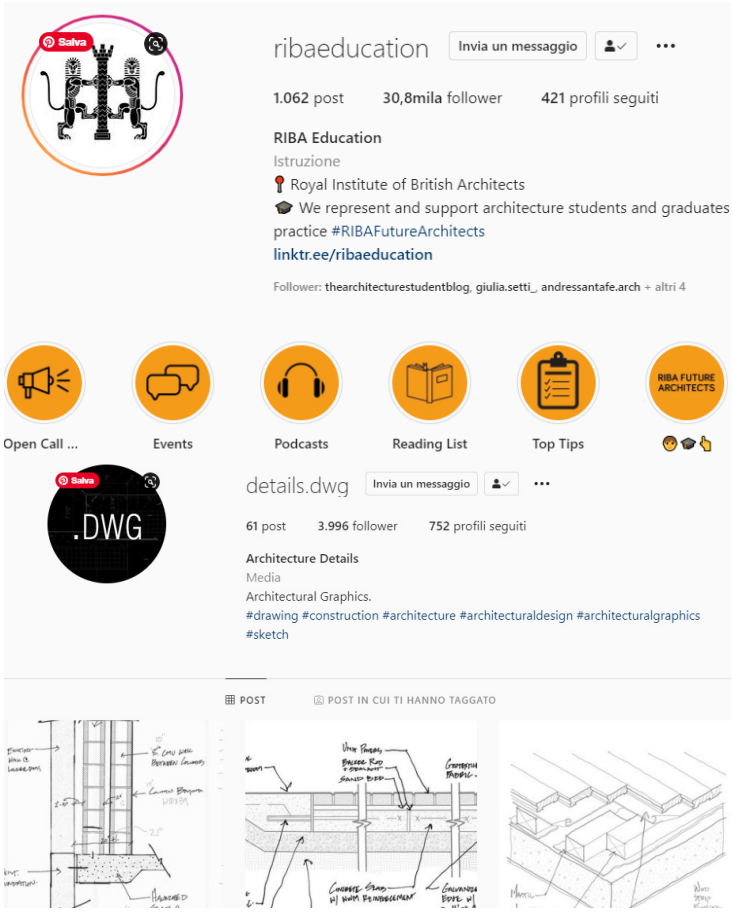
http://www.detailsinsection.org



https://divisare.com

Social: few examples from ig





…and don't forget YouTube