UNIVERSITÀ DEGLI STUDI FIRENZE
Scuola di Architettura

i CAD

Environmental Design | 2016-17
ARCHITECTURE and ENVIRONMENT LAB | Master Class | prof. G. RIdolfi, PhD

Computational Materiality for Sustainable Architectures and Comprehensive Skins

SCHEMATIC PROPOSAL

ASSIGNMENT GUIDE 03

ARCHITECTURAL ENVELOPE

The purpose of this assignment is to indicate the most efficient envelope solutions from an energetic and functional-architectural point of view and to present the technological design of a selected part of it.

Cover.
Antonio di Pietro Acerlino (FIlarete), Adam, 1460-64.

This page: Nikos Karatolios, Environmental Design A.A. 2013-14

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ASSIGNMENT GUIDE 03
Schematic Proposal | Architectural Envelope

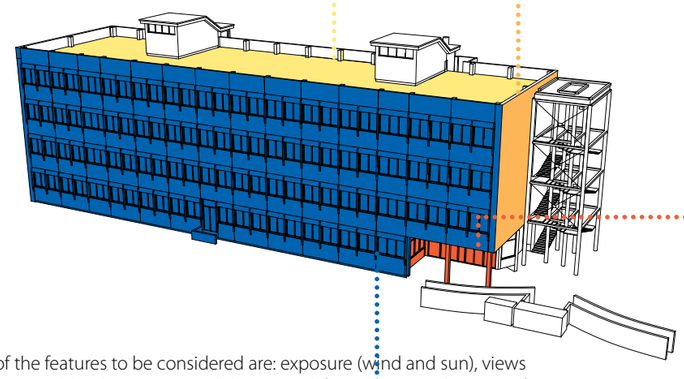
Antonio Averlino o Averulino
detto 1400-1469 ca

What to do

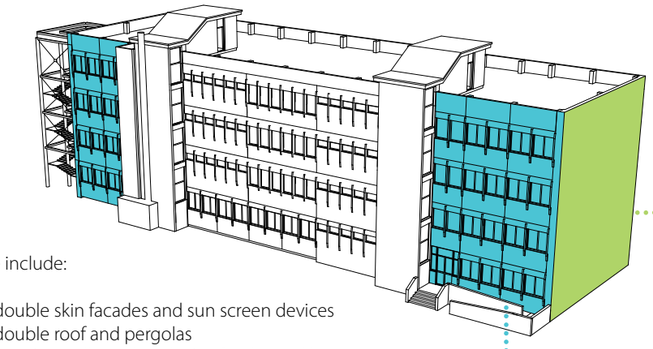
To carry out this assignment each group, is required to indicate, at the conceptual level, the different envelope solutions adopted for each part of the building complex and to develop the technological design of a significant portion of it. The proposed solutions will derive from the comparison of evaluable alternatives through appropriate energy modeling
This may concern the roofing system, a specific façade, or the proposal of an envelope system with indication of the invariant parts and variables components to be adopted to fit different requirements.

How to do

To develop this assignment, students will have to define for each side and/or part of the building complex the requirements system including environmental, architectural and functional goals.



Some of the features to be considered are: exposure (wind and sun), views of the external landscape, accessibility to and from the outside, type of activity and consequent internal environmental needs (illumination, thermo-hygrometric comfort, etc.).
Consistently, students will have to identify the technological solutions between those previously studied in Taccuino Assignment and to clarify their consistent use in the building portions.



These include:

- double skin facades and sun screen devices
- double roof and pergolas
- massive wall or other device for thermal lag
- natural ventilation and/or other devices for stack effect.

Proposed solutions can be represented using drawings, diagrams, photos and images of existing buildings or commercial solutions.
You will have to give schematic and synthetic (also with the use of ideograms) evidence of the positive and negative aspects for each of the proposed solutions.
For this part, the use of the energy modeling tools is required, at the mass level and at the analytical detail as well.

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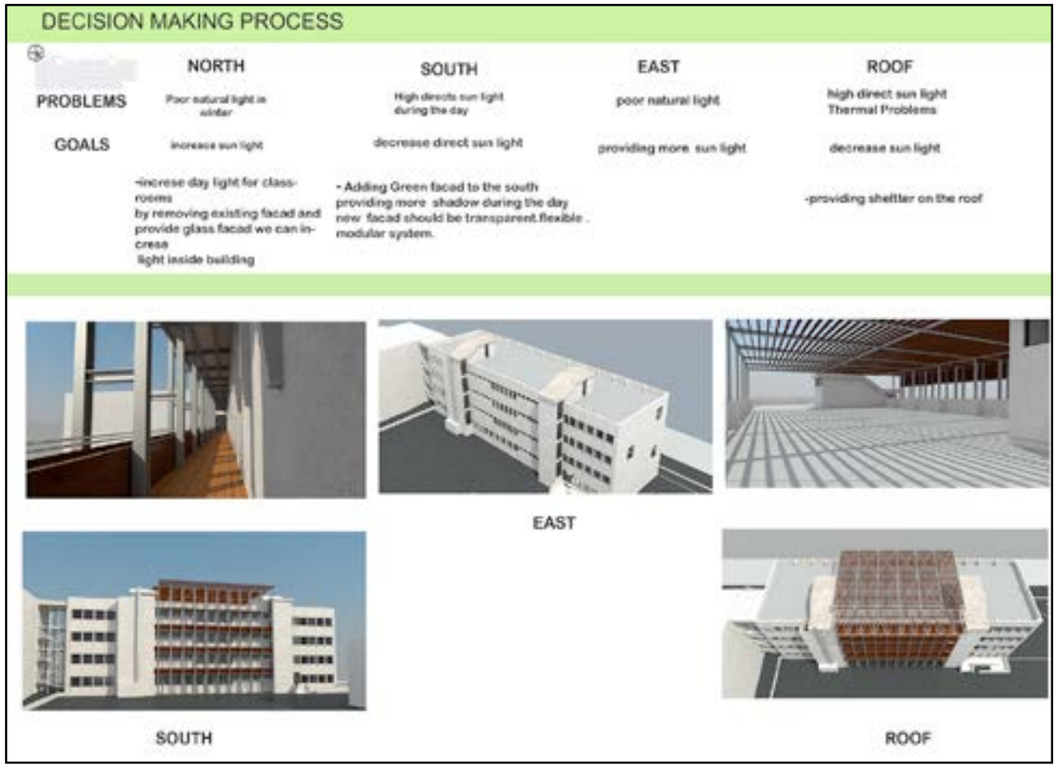
	WEAKNESS	PROPOSAL
ROOF	HIGH INSOLATION	ADD A NEW VENTILATED COVERING ON THE EXISTING ROOF
WEST FACADE	EMPTY SURFACE_ EMERGENCY STAIRS	ADD A NEW VENTILATED COVERING ON THE EXISTING ROOF
ENTRANCE	NOT CLEAR	ADD A DISTINGUIBLE ELEMENT
NORTH FACADE	LOW DIRECT SUN LIGHTING	REMOVE THE WALL AND CREATE A TOTAL GLASS DOUBLE SKIN FACADE
EAST FACADE	EMPTY SURFACE	ADD A “NEW ARCHITECTURE” TO INCREASE SPACES
SOUTH FACADE	HIGH DIRECT LIGHTING_ ABSORBING SUN RADIATION WHERE ARE NO TREES	ADD A “NEW FACADE” TO CREATE SHADOW

REFERENCES

“Hedge building” pavilion IGA, RostocK 2003_Germany

University of New Hampshire research 2012_USA

Valode & Pistre biopark 2006_Paris

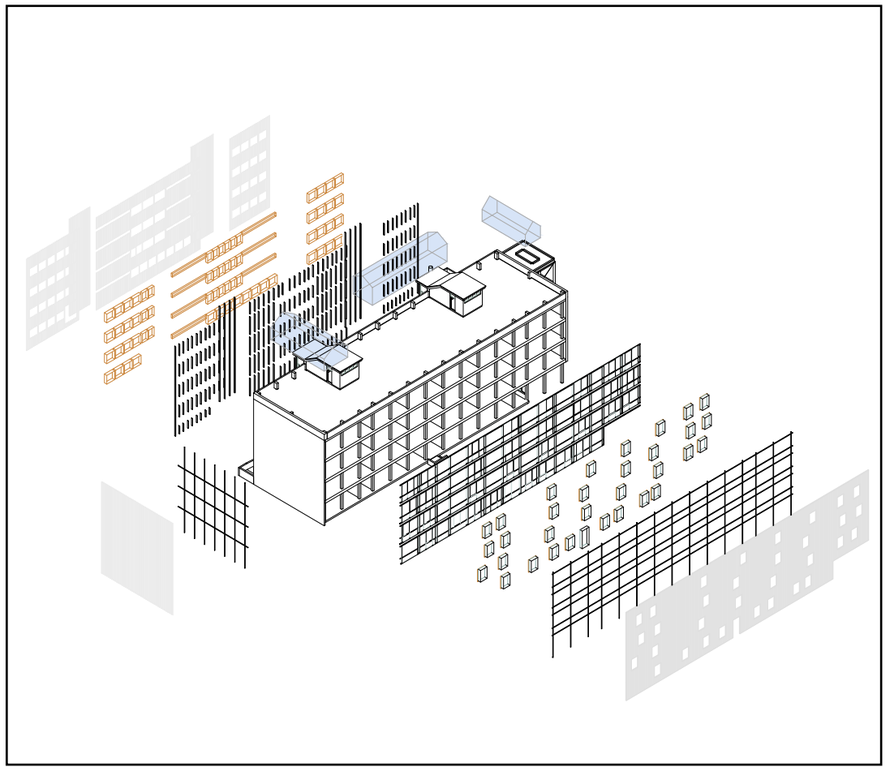


Previous page:
Marta Vannucci, Environmental Design, A.A. 2013-14

Left:
Tamara Ghanbari, Environmental Design, A.A. 2013-14

Right:
Olivia Gori, Environmental Design, A.A. 2013-14

Down:
Lornezo Antinori, Environmental Design, A.A. 2013-14



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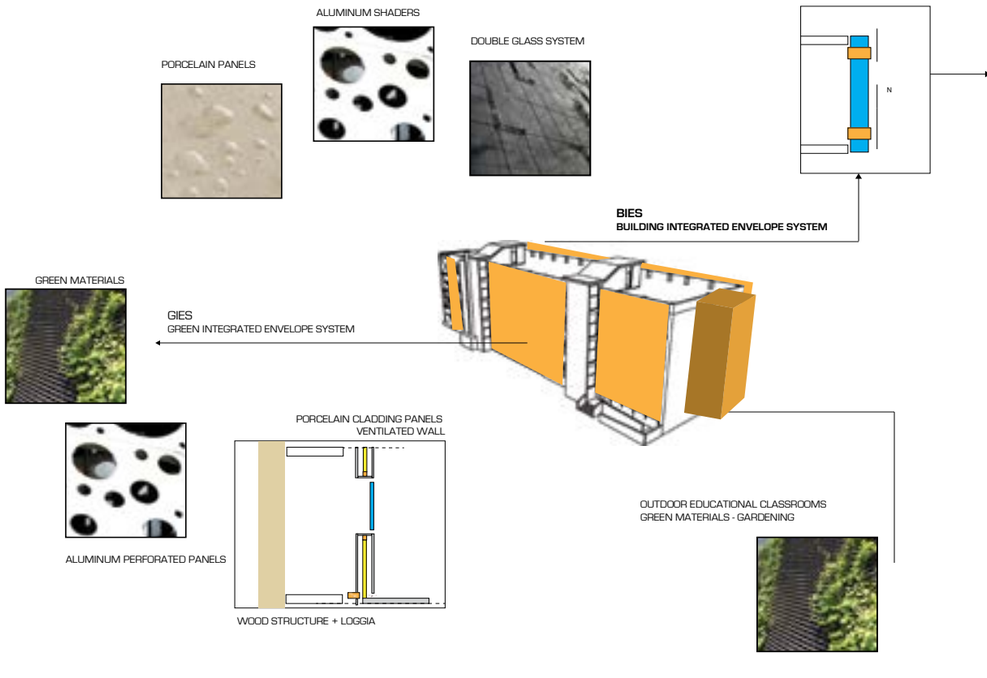
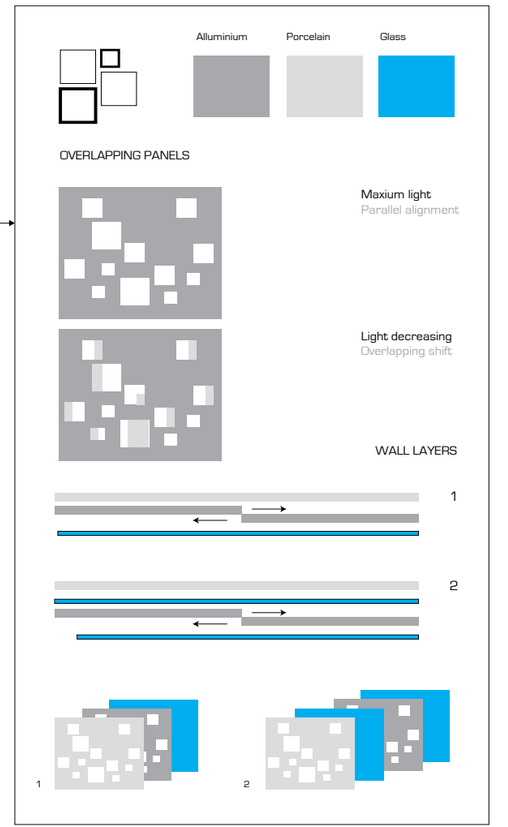
INTERVENTION STRATEGIES

STRATEGIES

- DESIGN SELF BEARING STRUCTURE
- MODIFY INTERNAL FUNCTIONS AND SPACES
- REMOVE PREFAB CONCRETE PANELS

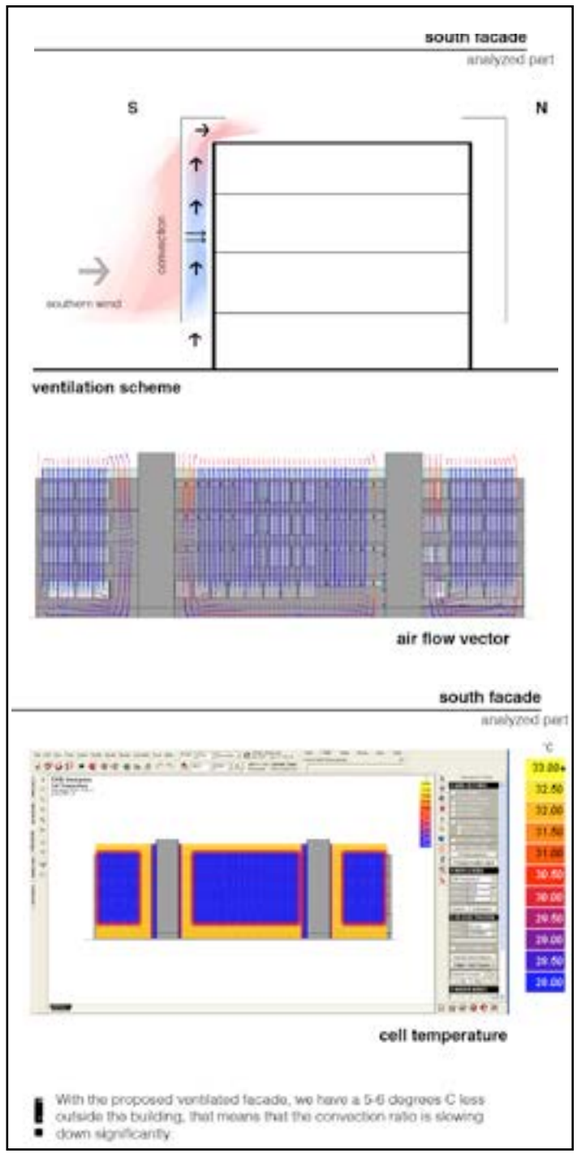




Right:
Arman Saberi, Environmental Design, A.A. 2013-14

Down:
Nikos Karatolis, Environmental Design, A.A. 2013-14

Next page
Robert Kane, Environmental Design, A.A. 2013-14



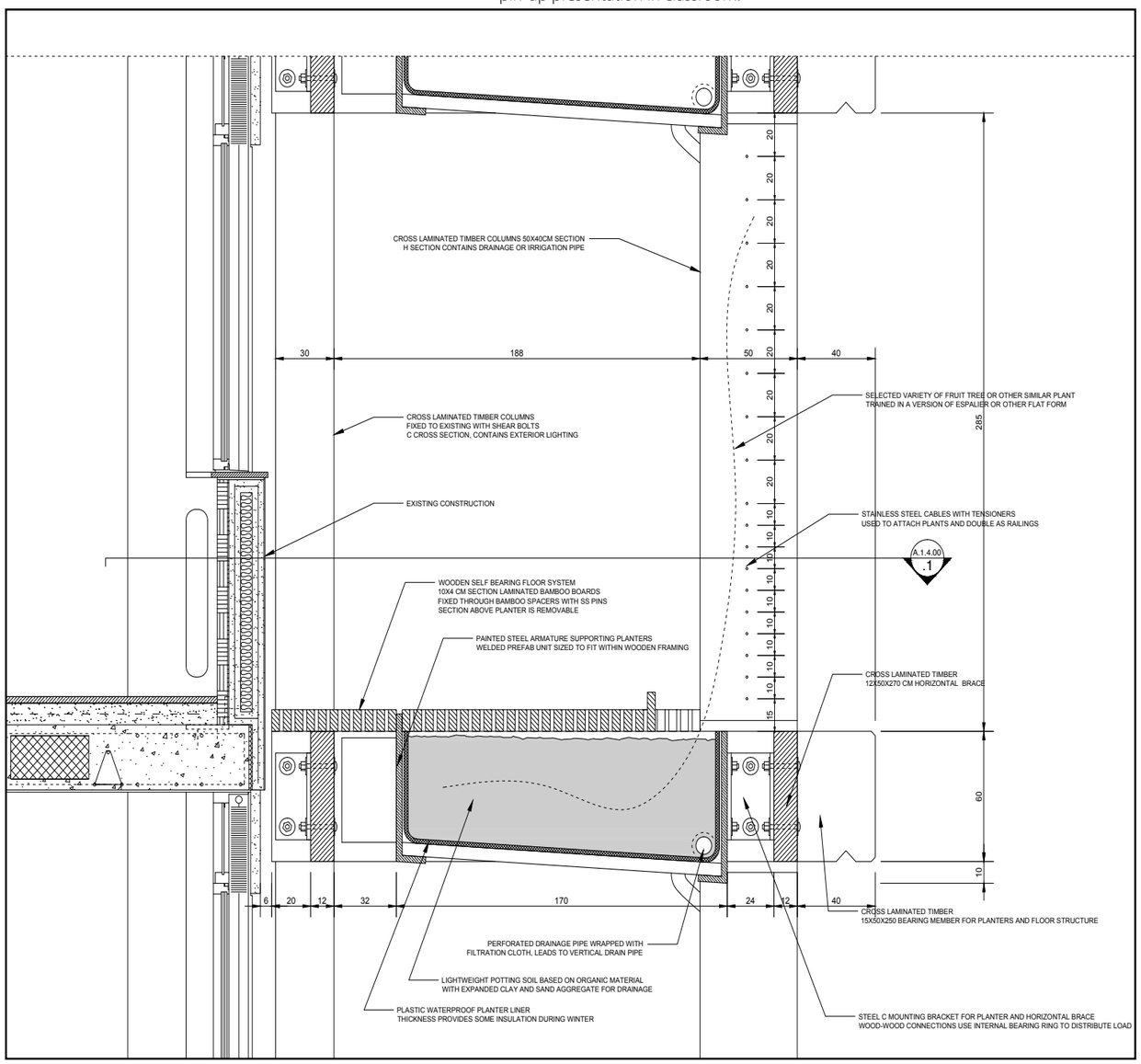
To effectively synthesize results the SWOT technique can be helpful.
On the basis of this indication, a significant portion of the envelope system will be identified and the technological-constructive details will be developed, with the specification of foundation, structure and sub-structure including bracing devices; cladding system differentiating the opaque, transparent and shielding elements.
Materials, the assembly and joining system will also be specified.
When choosing the envelope system, consider the next assignment concerns the realization of a scale technology model. Therefore, it is advisable to choose solutions that allow feasibile execution: a non-minor and unamendable aspect of building architectures

Outcomes & Evaluation

Students are asked to submit the following documents:

- n°1 sheet in UNI A1 format (vertical pagination) for the General Envelope System
- n°1 sheet in UNI A1 format (vertical pagination) for the Energy Modeling Mass Optioneering
- n°1 sheet in UNI A1 format (vertical pagination) for the Envelope Proposal
- n°1 shet in UNI A4 format (vertical pagination) for detailed enerrgy modeling and evaluation related to the detailed facade and its alternatives.

Evaluations will take place in the form of a poster pin-up presentation in classroom.



References

- Conceptual mass optioneering

  Resources and Textbooks on Mailab's web page «Environmental Design Lab» and mainly:

  https://issuu.com/artichoc/stacks/e9c-428624cfb4c148f0055371df06620

- The envelope design proposal

  https://it.pinterest.com/mailab_/environmental-design/

- The Building envelope
  http://www.mailab.biz/wp-content/uploads/LECTURES/_04. THE BUILDING ENVELOPE .pdf

- Assembly and Joining Structures.
  http://www.mailab.biz///wp-content/uploads/2015/01/04.-JOINING-STRUCTURES-.pdf

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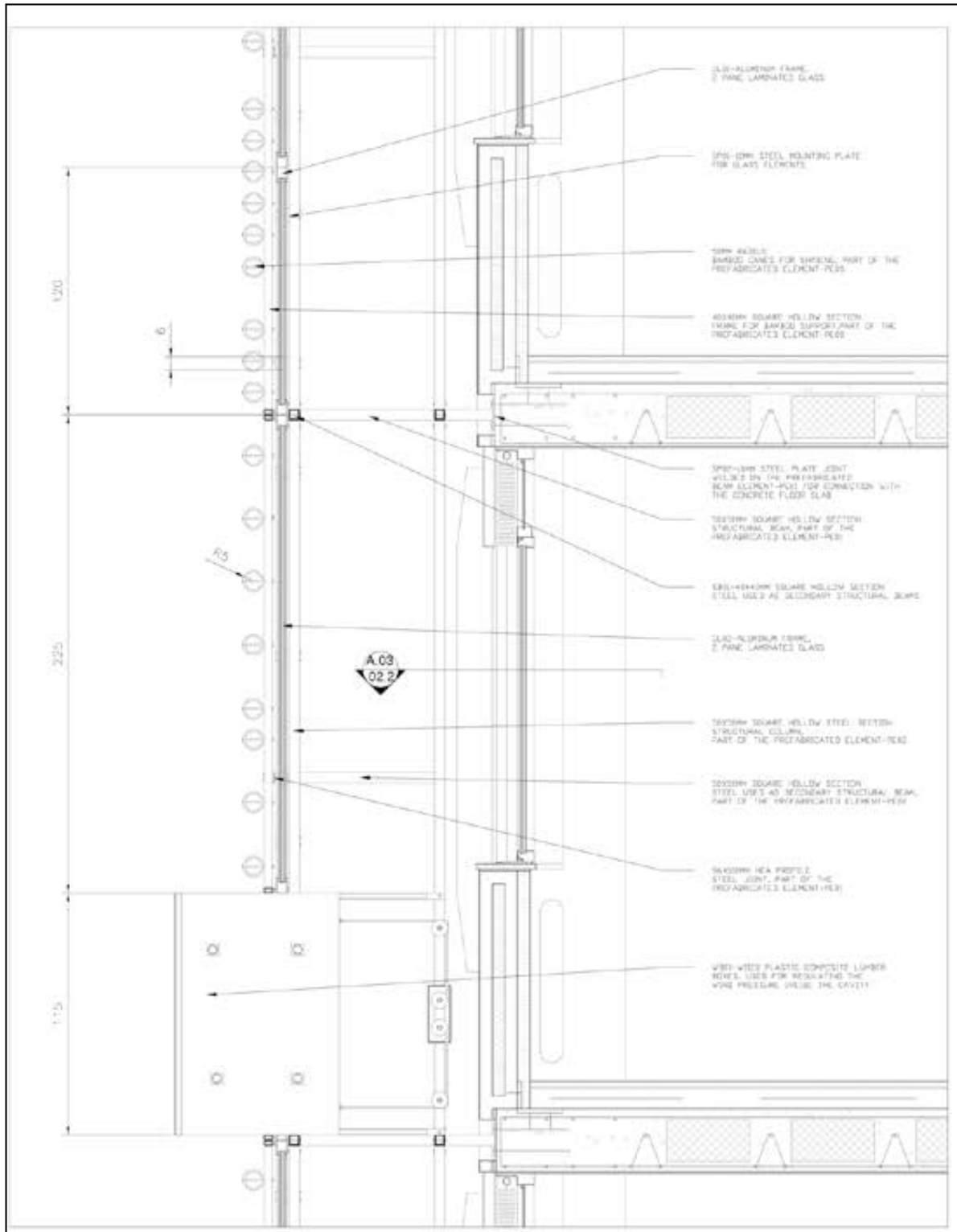
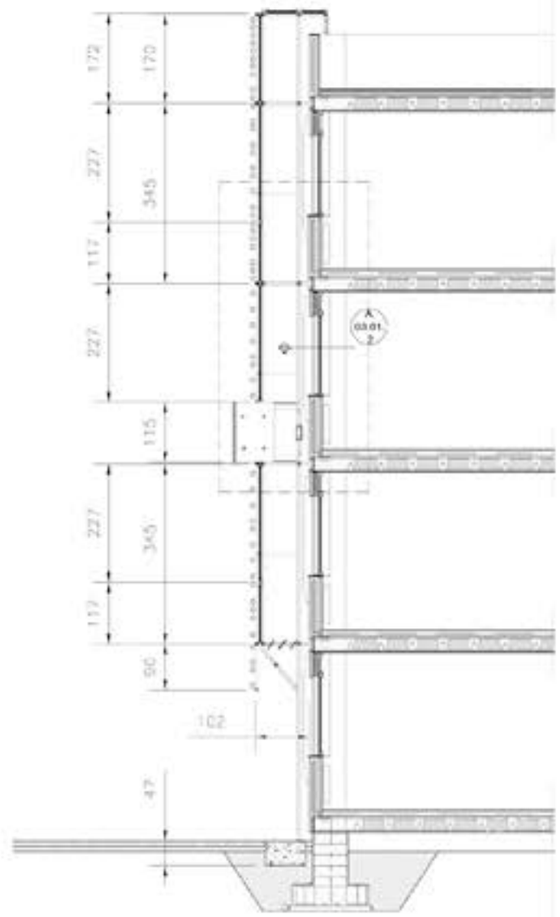


A.03.01.2 DOUBLE SKIN FACADE DETAIL 1:10



A.03.01.1 DOUBLE SKIN FACADE SECTION 1:50

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Dipartimento di Architettura
ICad International Course
Architectural Design

Environmental Lab

prof Giuseppe Ridolfi
a.y. 2013/2014

TECHNOLOGICAL ANALYSIS OF THE DESIGN PROPOSAL
Assignment 0

Nikos Karatolis

A.03.01 DOUBLE SKIN FACADE
VERTICAL SECTION AND DETAIL

A.03.01

Project
MIDDLE SCHOOL
MALAPARTE
VIA BALDANZI, 19
PRATO