iCAD International Course on Architectural Design
Second Level Degree Course FALL 2016-17 / 6 CFU
D59 — Architecture Structural Design Lab
B020741 – BUILDING SYSTEMS DESIGN
prof. arch. Giuseppe Ridolfi Phd

Architecture Structural Design Lab
BUILDING SYSTEMS DESIGN
Giuseppe Ridolfi

The grammar of building structure and architectural language
ASSIGNMENT#02

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FINAL ASSIGNMENT #02
Building without Functions.

The exercise consists in the model fabrication of a building without any use intended to be obtained through the volumetric transformation of a Weisshenoff building but safeguarding its structural reality.

In the prevoious page: Building in Porto Venere | here: R. Meyer, House in Bodrum

RULES   OF THE GAME
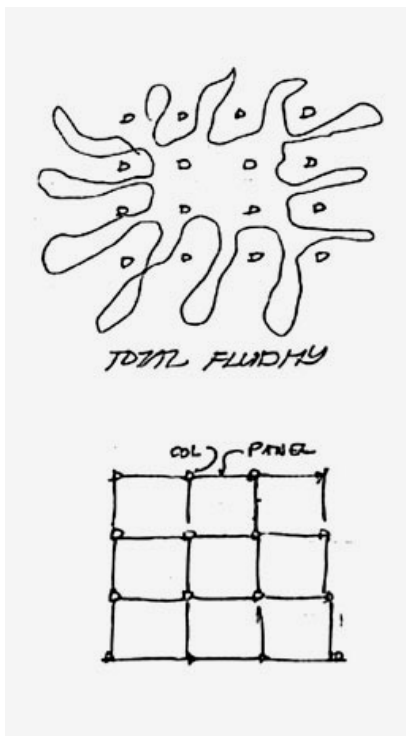
1. Each vertical structural element (including stairs) must lie on the original grid and be contained in its geometrical perimeter. Changes to the physical and geometric characteristics are the only ones allowed.
2. It is required the transformation (from a minimum of two to a maximum of 8) of the floors and facades perimeters.
3. Floor and façade transformations are to be understood as the line translation between two vertical elements that can occur in the three axes x, y, z
4. It is also allowed the rotation of the floors and facade lines in accordance with the points n° 3
5. Beams and not-bearing walls cannot touch the ground. If ground beams are important for the composition you must extend some internal vertical elements in order to give the impression the building is floating on the air
6. Not-bearing walls must be positioned in the central axis of pilasters and beams. Bearing-walls can assimilate beams and pilasters
7. It is required the total final surfaces must not exceed 30%, more or less, the original ones
8. The assignment must end with the numerical control scale model fabrication from file.
9. The final model, even in its multiple modes of representation and communication, will be the only result to be evaluated.

Initial instructions for the 9-square-grid exercise

DELIVERABLES

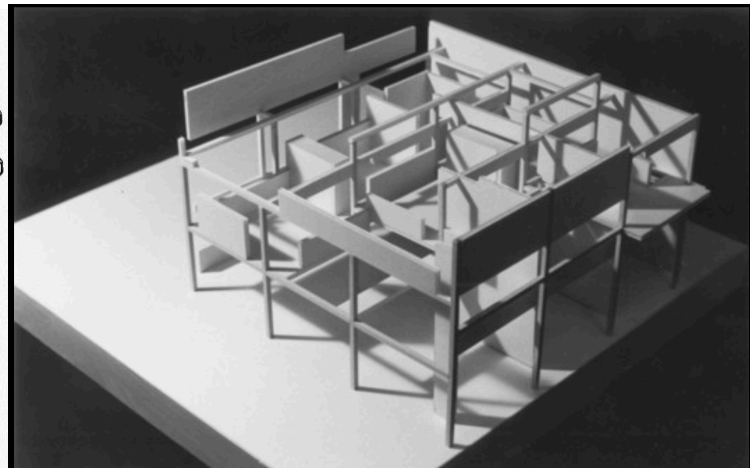Students must work in order to realize two UNI A1 vertical boards containing the following information:

- the representation of the grid extracted in the previous assignment including measures and a small photo of the original building
- a short narrative of the concept adopted for the transformation including references from architecture or other disciplines

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- The description, step by step, of the transformation process with short comments such as: shifting, stretching, rotating, mirroring, volumetric subtractions, repetitions, distorsions, fractalizations...
- 3D general view, rendered in gray-scale, of the final result integrated by other drawings (plans and sections) to give a full understanding of the proposal and the floor surfaces extimation of the original and new building
- verification of the feasibility of the 3d fabrication including dimensioning and highlighting the critical parts such as thickness of the smallest parts, bending and/or cracking of overhanging elements. For a reference see the below notes for fabrications
- some gray-scale renders with natural and/or artificial light (night vision) taken from an observer's point of view placed near the building and in some internal building points.

To integrate the design proposal a short video could be also included
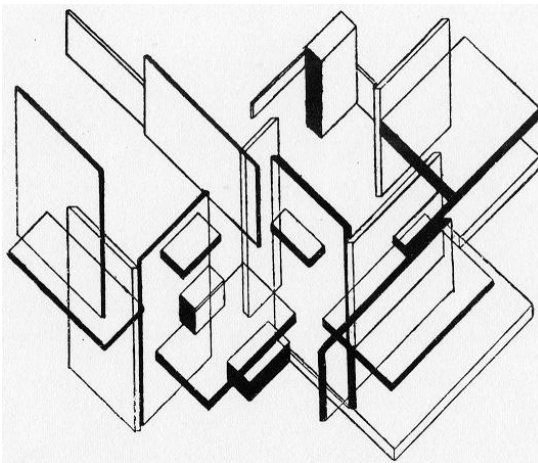
Theo_van_Doesburg_Architectuuranalyse, 1923   P. Eisenman, model of House II

NOTES FOR FABRICATIONS

The model has to be fabricated in two pieces:
• the plexiglass base-plate (30 cm x 30 cm) manufactured in 2D laser cutting technology where to engrave the reference grid, the graphical scale and to creates the holes where to lock the model footprint.
• the model of the building to be manufactured in 3D printing. In order to lock the model on the pedestal you need to consider a 6 mm extra length of the vertical elements.

Material= simil ABS withe
Maximum size (x,y,z) = 25 cm x 20 cm x 14 cm
Safest maximum size (x,y,z)= 24 cm x 18 cm x 15 cm)
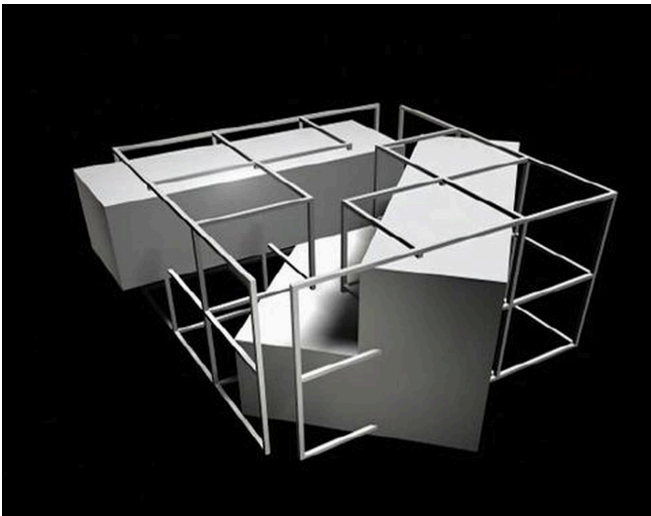Minimum thickness= 1 mm
Safest minimum thikness=1,5mm
Minimum detail= 0,1 mm (such as step high)
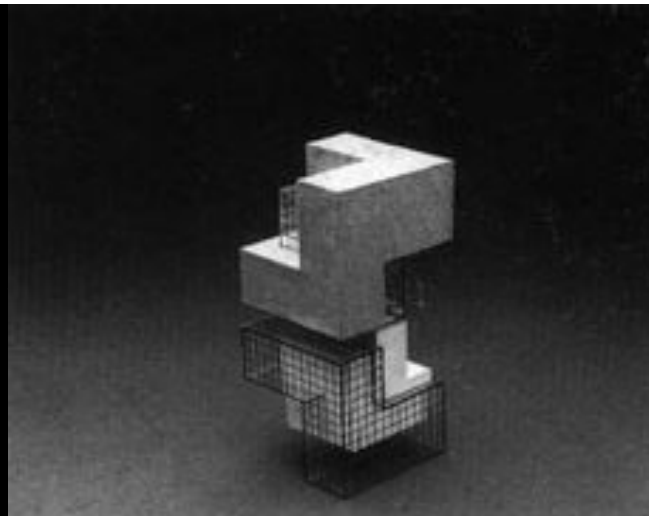Cost extimation= Bring the 3d file and ask for it in aula 3
File format= .obj .fbx

>> Architectural References: https://it.pinterest.com/mailab_/speculative-structuralism/

G. Ridolfi. The grammar of building structure and architectural language_Excercise

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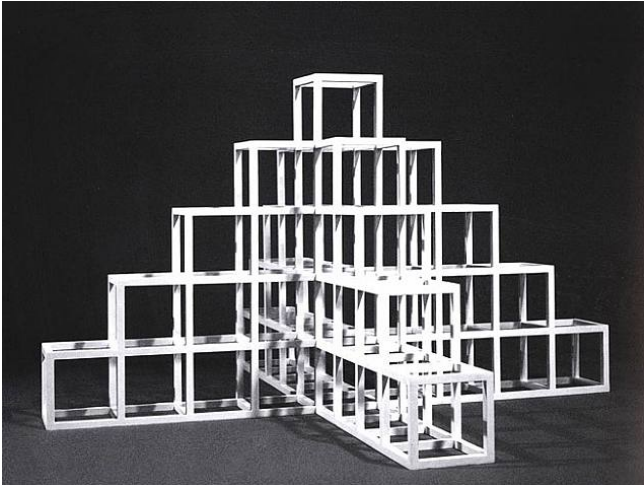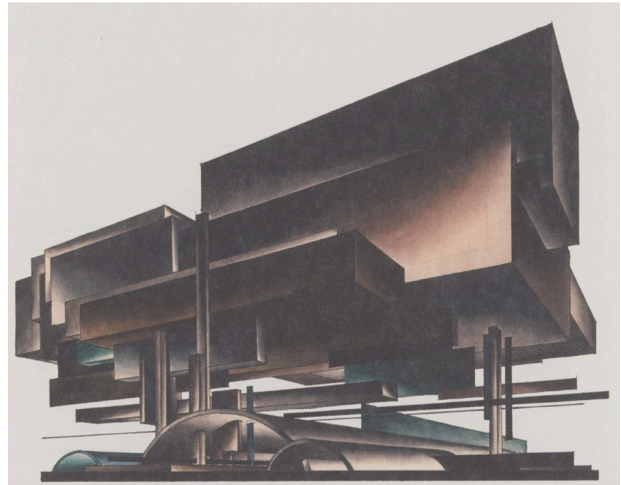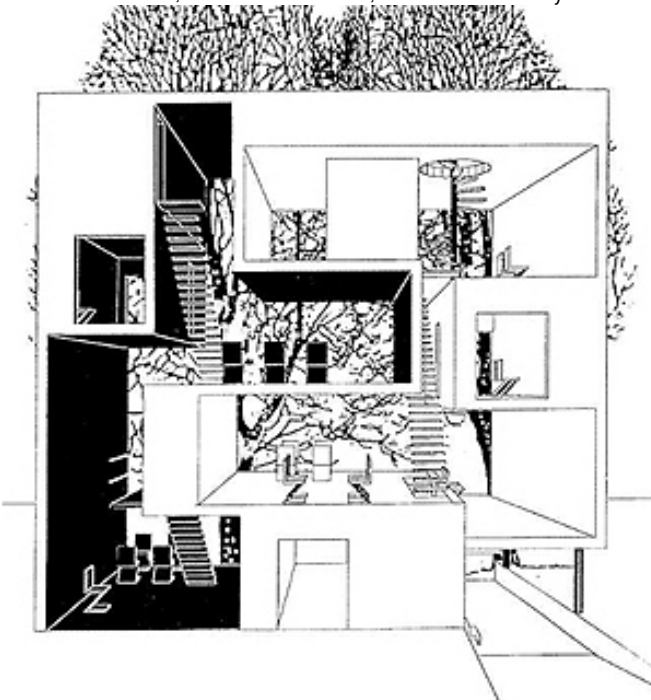prof. arch. Giuseppe Ridolfi Phd

P. Eisenman, model of House X

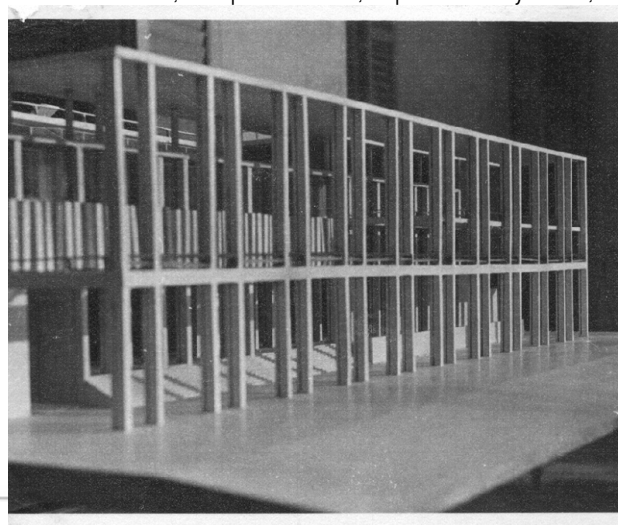P. Eisenman, model of House XI

sol-lewitt-hartford, cubic construction,1971-moma-new-york

Iakov Chernikhov, Composition 138, airplane factory 1928,

Le Corbousier Villa a Cartagine, 1928

G. Terragni , Palazzo dei Ricevimenti e dei Congressi 1937

G. Ridolfi. The grammar of building structure and architectural language_Excercise