

What and Why

Construction teaching in our School starts by posing three questions: '*what is it made of*' '*how is it constructed*', '*how is it designed in order to be constructed*'.

To answer the question '*what is it made of*' students have to be acquainted with building materials, their properties, possibilities, appropriateness and potential. This question aims to enrich their visual vocabulary and expose them to the various uses, applications and precedents in order for them to make the wide range of materials available to them.

To answer the question '*how is it constructed*' students have to become familiar with building elements, construction methods and assembly. This question aims to explain the sequence of works on the building site and how these are anticipated during the design process.

To answer the question '*how is it designed in order to be constructed*' students have to think of a design theme from the conceptual to the working detail stage. This question aims at making the ultimate connection between idea and building, concept and materiality.

In these stages of construction teaching students learn about:

- Observing a building and its elements, recognize its materials and the ways in which they are put together and to understand what is their role in the entirety of the building, Measure and draw in small scales (1:20, 1:10, 1:5 etc) what they have observed
- Distinguishing the degree of detail that goes into a 1:20 or bigger drawing of a building they have designed and use conventions to draw materials and elements from different materials in plans and sections.
- Anticipating the lighting, acoustics, noise, pollution, energy issues of heating and cooling, ventilation and dampness, solar shading, and energy consciousness.
- Calculating loads and other forces on simple structures
- Using reinforced concrete (as the most popular structural material in Greece)
- Building services
- Lightweight metal structures

These modules are delivered with the ambition that students will:

- learn about materials and their properties, availability, potential and advances in the building industry that can offer new possibilities to materials with established uses.
- be able to select the appropriate building elements from the wide range in which they are produced from the building industry.
- learn about established construction methods but also about unique

situations where detailing was designed to materialize a scheme exclusively.

- have a good grasp of environmental, climatic, geographic, financial, but also ethical implications that accompany the use of certain building materials and construction methods.
- be able to envisage the feasibility and encounter the practicalities of the materialisation of their design proposal.
- be able to resolve the construction of a design in which ordinary details are not adequate.
- be competent to deliver working drawings, which will communicate their ideas clearly to the manufacturers, to the builders, etc.
- be familiar with the different stages of the construction process as this is experienced on site.
- be able to consider the buildability of a design proposal.
- be ultimately capable of anticipating an idea and its tectonics simultaneously.

'what is it made of' In this one semester module, weekly lectures on building materials are delivered and students are encouraged to put to together their own technical library by collecting leaflets from the building industry. Small exercises of measure drawings ask students to find **an existing building element a door, a window, a staircase, a canopy, a cantilever etc.) in three different versions**, in each one version the element to be made by different materials (a cantilever made of concrete, timber and steel). Then they have to photograph, sketch, measure, and finally draw plans, sections and elevations of the building element of their choice at 1:10 in all three versions in order to become familiar with distinguishing working drawings which portray different materials. In the second phase of this question students draw at 1:20 scale published working details of known examples in order to gain an insight into how eminent architects detail their designs. **In this case they choose in their three details the same building material which will be playing a different protagonist role each time.** For example if they choose steel they will have to find three published details where steel is used as a canopy, a balcony or a staircase.

A module on structural engineering supports this module where the structural properties of materials are taught.

'how is it constructed' In this yearly module, weekly lectures are delivered on building elements (staircases, openings, walls, partitions, roofs, finishes etc.) construction methods and assembly and explain the sequence of works on the building site and how these are anticipated during the design process. Students work in groups on a design project of a small dwelling, which is given to them in a sketchy layout. They are then encouraged to 'personalise' their designs and work for one semester on the entire scheme at 1:50. The submission includes plans, sections, elevations and drawings of the wood form of the building including all load bearing elements and a size estimation (students are encouraged to adopt concrete for most of the structure of the building as concrete is the most popular material

How

in Greece). In the second semester of this module weekly lectures continue but also include the principles that govern the organisation of a project and its working drawings as these are delivered on site. In parallel, the class visits building sites at different stages of construction. In this phase students work on a 1:20 cross section of their dwelling and select five key details which they draw in 1:10, 1:5 or 1:2.

A module on energetics and environmental issues of lighting, acoustics, pollution, waterproofing, sound-thermal and other insulation supports this module through a lecture course.

From the answer to the question '*how is it designed in order to be constructed*' students acquire the adequate background in order to encounter a more complex question which is 'how do we anticipate design and its materiality simultaneously' or even more how the concept of a design proposal can derive from the answer to its materiality. In this yearly module students have to think of a design from the conceptual to the working detail stage. This question aims at making the ultimate connection between idea and building, concept and materiality. This module will be taught in the forthcoming year.

This question has been assisted in the recent past by the question 'guess what and how'. Students observe public buildings in the city of Thessaloniki which are interesting in terms of their construction but the details of which have not been published. They then try to understand what materials they are constructed of and how these materials are put together. They then reflect these thoughts in working details.

Who

Construction is taught by permanent and short contract lecturers who are qualified architects who practise architecture to a great or lesser extent.

Structural engineering is taught by civil engineers with an overview of a senior professor of architecture.

When and to What Extent

The introduction to building materials (*'what is it made of'*) is taught in the spring semester of the first year once a week and it includes a two-hour lecture and informal contact with tutorials on the exercises set up.

The connection between design and construction or the '*how is it constructed*' module is taught in the first and second semester of the second year. In the first semester students finalise the first stage (1:50) and in the second semester students work on the detailed stage of their design.

The intention of the School curriculum is to continue with the yearly studio design / construction module during which there will be further exploration in the interconnection between idea and materiality.

FIRST CYCLE INTRODUCTORY INCLUDES THE FIRST YEAR	SECOND CYCLE BASIC STUDIES INCLUDES SECOND, THIRD AND FOURTH YEAR	THIRD CYCLE DIPLOMA INCLUDES FIFTH YEAR
What is it made of (one semester)	How is it designed to be constructed (two semesters)	
Structures (one semester)	How do we think of design and construction simultaneously (two semesters)	
	Reinforced concrete (one semester)	
	Energetics (one semester)	
	Services (one semester)	
	Lightweight structures* (one semester)	
	Metal structures*(one semester)	
	Energy conscious design*(one semester)	

*optional

The aim of the curriculum as a whole is to offer answers to the holistic questions it poses on the teaching of construction at its different stages, increasing the degree of complexity of the content of the questions as students progress.

The effectiveness of a school curriculum is to allow graduates to synthesise the knowledge acquired in the five continuous, uninterrupted and integrated years of studies in architecture in order to think of architecture as a whole. Along these lines our School attempts to convey ways of thinking construction in the broader and complex context of architecture. Alongside the teaching of the existing body of knowledge on construction our School attempts to marry up in the studio idea and building.

During the design process a systematic effort is made to encourage students to continue to be creative while thinking of how something could be made and constructed without it losing the original tactile, sensual and other qualities anticipated at the conceptual stage of the design process.

Despite the ambitious content of our statement we recognize that there are certain items missing from the teaching of construction from our school such as experimentation with real materials and more contact with building sites. However, there is optimism which, combined with hard work, might eventually yield the desired outcome.

Virtual Reforms

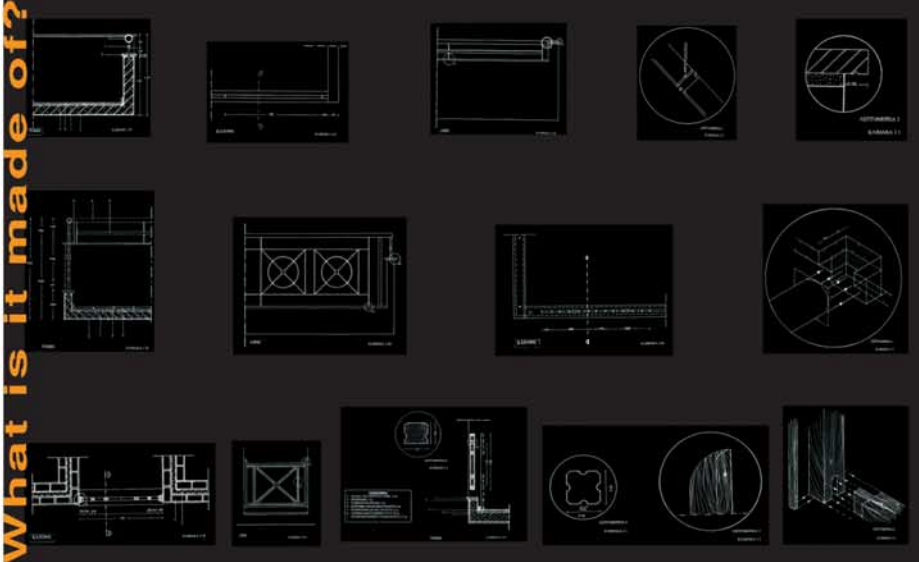
Construction teaching is approached through the questions: **'what is it made of', 'how is it designed in order to be constructed' and 'how are design and construction thought simultaneously'.**

Teaching **'what is it made of'** is understood by acquainting students with building materials, their properties, possibilities, appropriateness and potential. This teaching aims to enrich their visual vocabulary and expose them to the various uses, limitations, applications and precedents in order for them to make the wide range of materials at their disposal when they design.

Teaching **'how is it designed in order to be constructed'** aims at familiarizing students with building elements, construction methods and assembly. This teaching explains the sequence of works on the building site and how these are anticipated during the design process.

Teaching **'how are design and construction thought simultaneously'** intends to educate students to think of a design from the conceptual to the working detail stage. The objective of this teaching is to make the ultimate connection between idea and building, concept and materiality by using all knowledge acquired from the aforementioned modules exploiting student creativity through experimentation.

What and Why



'What is it made of' is taught in one semester module, during which weekly lectures on building materials are delivered and students are encouraged to put together their own technical library by collecting leaflets from the building industry. Small exercises of measure drawings ask students to find an existing building element (a door, a window, a staircase, a canopy, a cantilever etc.) in three different versions, each one made by different materials (a cantilever made either of concrete, or timber or steel). Then they have to photograph, sketch, measure, and finally draw plans, sections and elevations of the building element of their choice at 1:20 in all three versions in order to become familiar with distinguishing working drawings, which portray different materials. In the second phase of this question students draw at 1:20, 1:10, 1:5, 1:2, 1:1 scales published working details of known examples in order to gain an insight into how eminent architects detail their designs. In this case they choose in their three details the same building material which has played a different protagonist role each time. For example if they choose steel they will have to find three published details where steel is used as a canopy, a balcony or a staircase.

A module on structural engineering supports this module where the structural properties of materials as well as the structural principles that allow a building to stand up, both conceptually and mathematically, are taught.

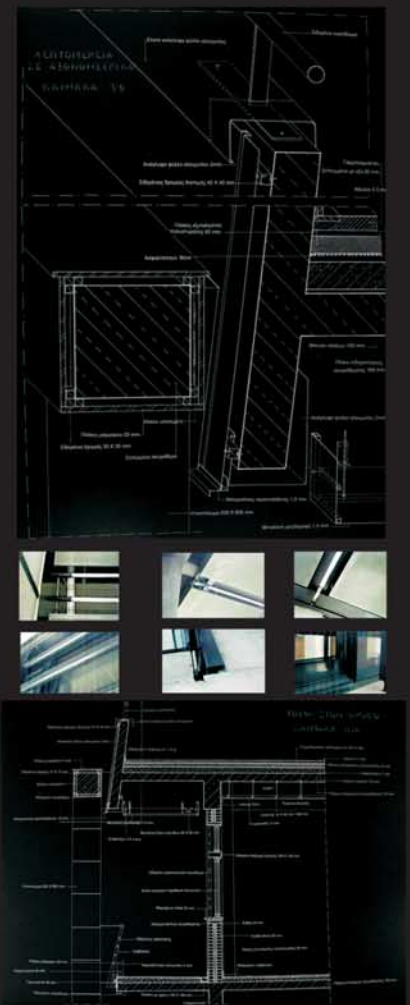
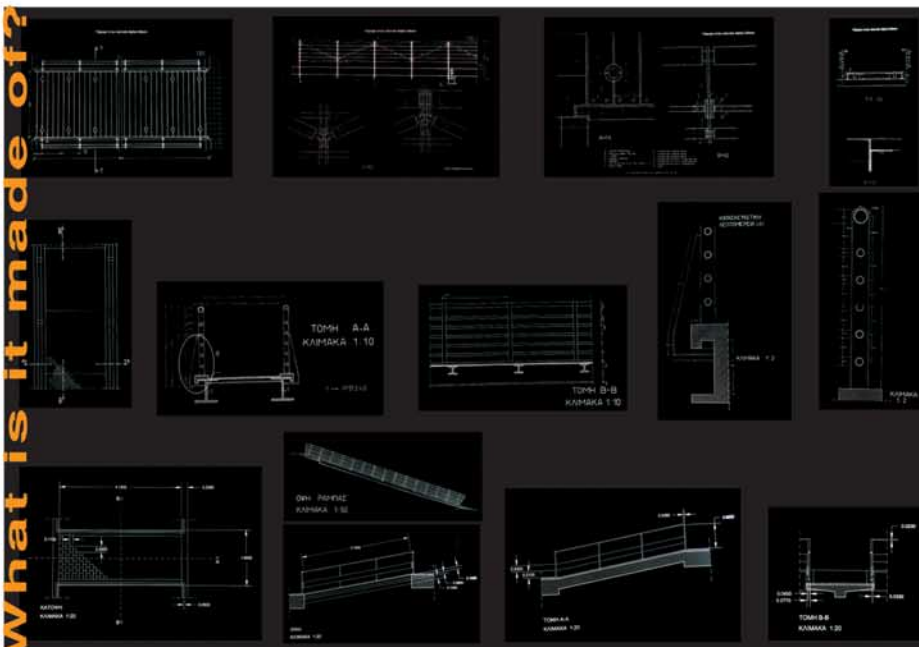
'How is it designed in order to be constructed' is taught in a yearly course. During this course, weekly lectures on construction methods, assembly of components and on building elements (staircases, openings, walls, partitions, roofs, finishes etc.) are delivered. The sequence of works on the building site are explained with regard to the ways in which these are anticipated during the design process. Students work in groups on a design project of a small dwelling, which is given to them in a sketchy layout. They are then encouraged to 'personalise' their designs and work for one semester on the entire scheme at 1:50. The submission includes plans, sections, elevations and drawings of the wood form of the building including all load bearing elements and a size estimation (students are encouraged to adopt concrete for most of the structure of the building as concrete is the most popular material in Greece). In the second semester of this module weekly lectures continue but also include the principles that govern the organisation of a project and its working drawings as these are delivered to the tender and ultimately to the builders on site. In parallel, the class visits building sites at different stages of construction. In this phase students work on a 1:20 cross section of their dwelling and select five key details, which they draw at 1:10, 1:5 or 1:2.

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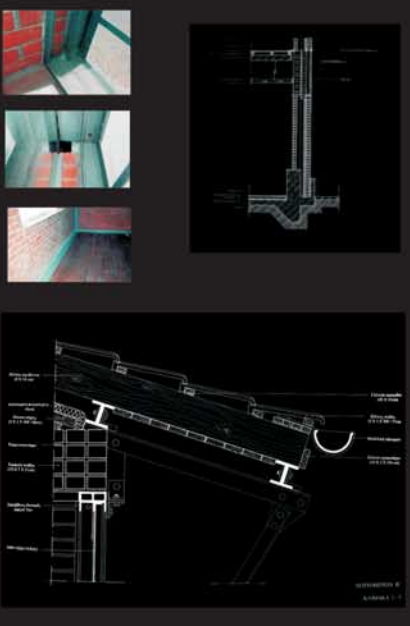
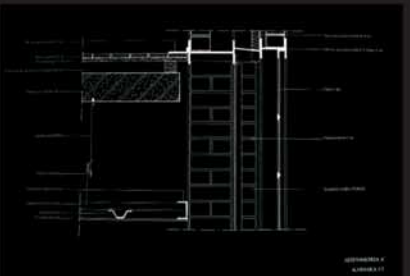
From the teaching of **'how is it designed in order to be constructed'** students acquire the adequate background in order to encounter a more complex question which is **'how do we anticipate design and its materiality simultaneously'** or even more how the concept of a design proposal can derive from the answer to its materiality. In this yearly course students have to think of a design from the conceptual to the working detail stage. This question aims at making the ultimate connection between idea and building, concept and materiality.

This course will be taught in the forthcoming year. This question has been assisted in the recent past by the question 'guess what and how'. Students observe public buildings in the city of Thessaloniki which are interesting in terms of their construction but the details of which have not been published. They then try to understand what materials they are constructed of and how these materials are put together. They then reflect these thoughts in working details.

Three compulsory modules are also delivered to the students on reinforced concrete (as the most popular structural material in Greece), Building services and Lightweight metal structures.



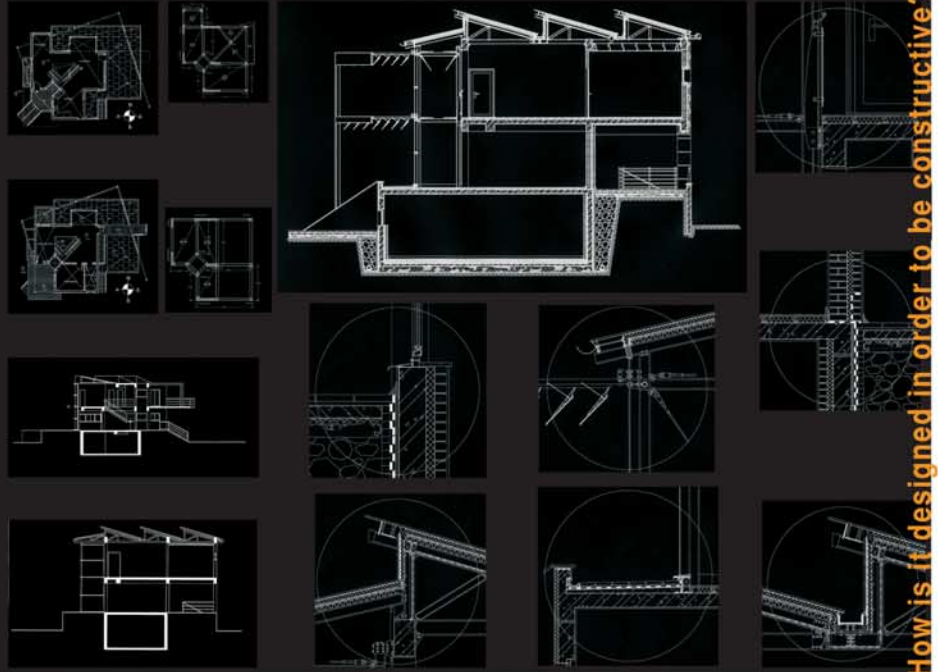
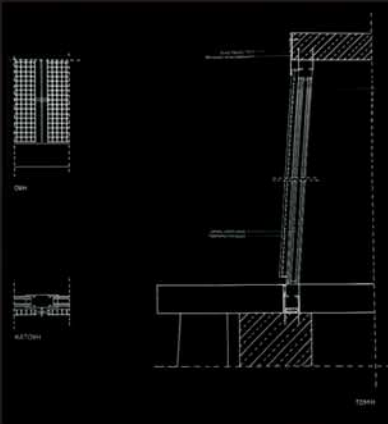
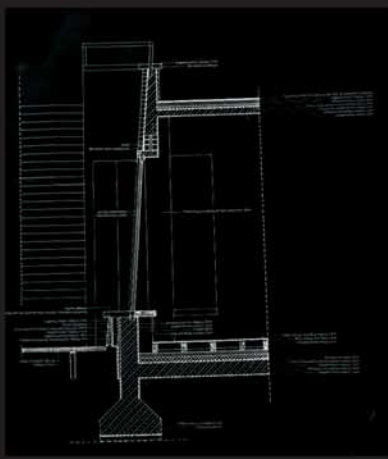
Guess What and How



Construction is taught by permanent and short contract lecturers who are qualified architects who practise architecture to a great or lesser extent. Structural engineering is taught by civil engineers with an overview of a senior professor of architecture. Energetics is taught by architects and services is taught by mechanical engineering.

The introduction to building materials ('what is it made of') is taught in the spring semester of the first year once a week and it includes a two-hour lecture and informal contact with tutorials on the exercises set up. The connection between design and construction or the 'how is it designed in order to be constructed' module is taught in the first and second semester of the second year. In the first semester students finalise the first stage (1:50) and in the second semester students work on the detailed stage of their design.

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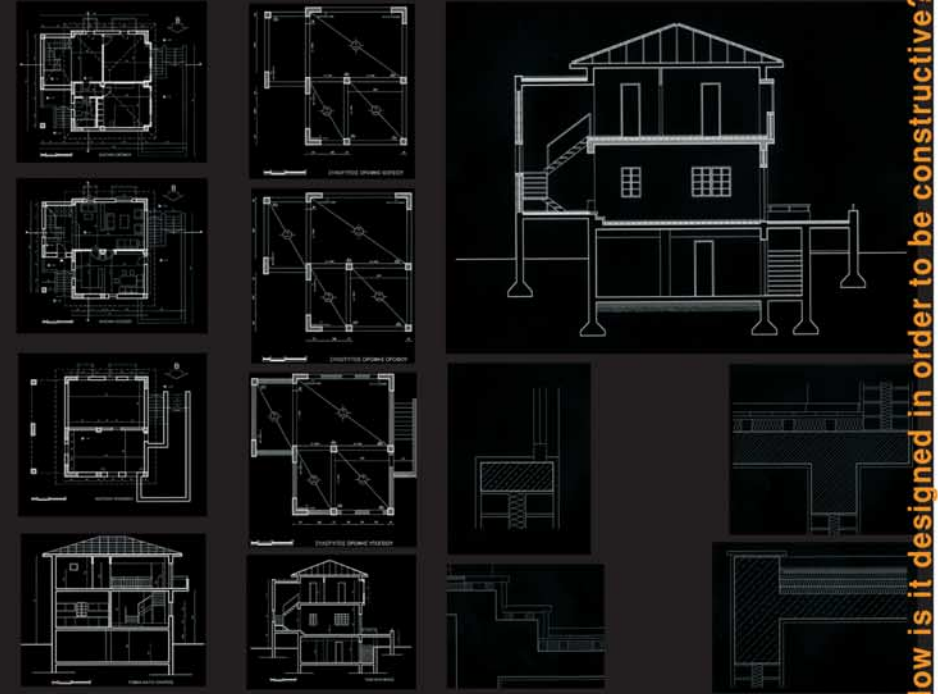
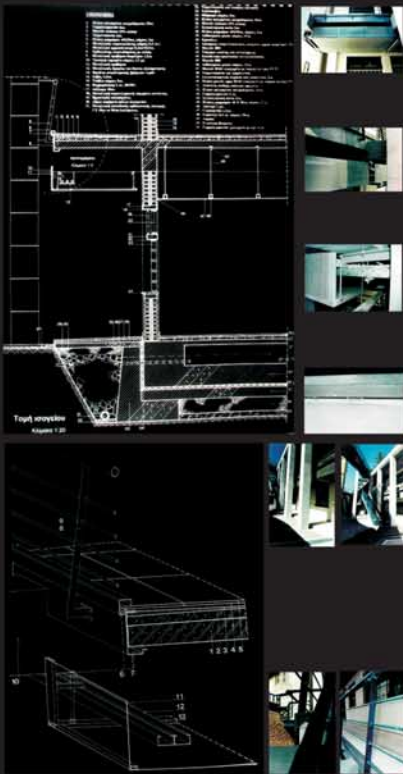


How is it designed in order to be constructive?

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How is it designed in order to be constructive?

School of Architecture, Aristotle University of Thessaloniki, Greece