



Dipartimento di Architettura e Territorio – dArTe

Corso di Studio in Architettura quinquennale – Classe LM-4

Degree course	Five-Year Architecture
Course code	SAR 11
Lecturer	Adriano Paoella
Course name	Designing of building systems
Disciplinary area	Technology of architecture
Disciplinary field of science	ICAR 12
University credits - ECTS	6
Teaching hours	60
Course year	2°
Semester	1 semester

Synthetic description and specific course objectives

This course is held during the second year and is aimed, as required by the specific education Objectives of the Course Article 4 of the Regulation, at "orienting mainly to basic education by providing the foundations for technical control and construction of architectural design." In this context, the course prepares an educational process that provides, through the analysis of contemporary buildings, cognitive and interpretative elements of the solutions that can increase energy and environmental efficiency of buildings. This course starts from the concreteness of the solutions already adopted and practiced, with a focus on providing the technical equipment (interpretative skills and specific knowledge of technological solutions), which may become the basis for future cognitive and elaborative acquisitions included in the Course.

Considering "the project as a process of synthesis and a crucial and qualifying opportunity of the built environment" (ib), the course aims at providing the theoretical and technical tools that allow to implement the design disciplinary choices being aware of the complexity of technical, environmental, and social reports in which the project is included, giving space to the practice of the innovation recalled in the Training Objectives qualifying the LM4 class Article 3 of the academic regulations of the Course.

Course entry requirements

It is not possible to take this exam, if the exam 'Materials for Architecture' is not passed

Course programme

A. Presentation of Topics

General information about the environmental "weight" of the construction industry and the role of the project in reducing this weight. Consideration of the many variables to be considered in the choice of technological solutions: examination of a particular case polystyrene (1st Lecture). Introduction to the issues of appropriateness of technological solutions, bioclimatics, environmental design of buildings (2nd, 3rd Lecture). Relations

between construction methods and places (4th Lecture).

B. Composition of common bases

Presentation of the main building systems, in particular those aimed at improving energy efficiency and reducing the environmental impact, their examples and analysis (5th, 6th Lecture). Elements for representation of technological projects in 1:50 and 1:20 scale (7th, 9th Lecture). Hand drawing of technological sections representative of the buildings (exercises during 5th-9th Lecture). The manual "Sustainable Building" will make it possible to ensure proper interpretation of construction items adopted.

1st Review: quality of materials processed in the lectures and integrated with self-employment of students.

C. Analysis of technological systems adopted in contemporary buildings.

The construction system as a tool for improving the efficiency of buildings (10th-12th Lectures and exercises in the classroom). The students will choose examples of contemporary architecture and analyze the technological solutions implemented, energy efficiency and environmental solution in the manner expressed in the manual "Sustainable architecture and bricks."

2nd Review: interpretative capacity of buildings through the development of bioclimatic diagrams, sections 1:50 and 1:20 scales.

D. Project development

Development of design solutions in the form of low-impact building systems of a simple type of residential building (provided by the course). Development of bioclimatic schemes (a summer/winter and day/night scheme) and technological solutions to 1:50 scale (one section) and 1:20 scale (one section) designed on the basis of the knowledge acquired in the course.

3rd Review: proactive approach to energy and environmentally efficient building systems.

Expected results

Basic knowledge of energy and environmentally efficient building systems and ways of their representation.

Cultural rudiments for the interpretation of technological solutions in contemporary architecture.

Basis for bioclimatic of ecological interpretation of buildings.

Course structure and teaching

Lectures (*hours/year in lecture theatre*):

Practical class (*hours/year in lecture theatre*):

Practical / Workshops (*hours/year in lecture theatre*):

Student's independent work

Part A-D. Study of materials provided in the lectures and reference texts (20 h)

Part B. Arrangement of papers developed in the classroom (10 h).

Part C. Research and interpretation of contemporary projects whose construction systems are appropriate in terms of environmental and energy efficiency. Integration and strengthening of interpretative graphics carried out in the classroom on selected buildings

and preparation of a dossier of analysis and interpretation of a contemporary building consisting of a report, bioclimatic patterns, design of technological solutions (1:50, 1:20) (40 h).

Part D. Integration and deeper analysis of papers discussed and set in the classroom (20 h).

Testing and exams

Part B

1st Review: quality of materials processed in the lectures and integrated with the self-employment of students. Delivery of processed materials (A4 size)

Part C

2nd Review: interpretive capacity of buildings through the development of bioclimatic diagrams, sections 1:50 and 1:20. Delivery of building report and related drawings (A4 and A3)

Part D

3rd Review: proactive approach to energy and environmentally efficient building systems. Delivery of drawings (A3 size)

Suggested reading materials

A.Paoletta, R.Cocci Grifoni (2012), L'uso del polistirene espanso in edilizia, all. Progetto ambientale, Trieste

C.Nava (2013), Edifici sostenibili. Particolari costruttivi, DEI, Roma

A. Paoletta (2009), Architettura sostenibile e laterizio, Edizioni Ambiente, Milano

Every lecture will provide specific support materials for the three topics dealt with (sources, drawings, texts)-



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Insegnamento	Design of building systems
Ambito disciplinare	B
Settore Scientifico Disciplinare	8c/1
Numero di CFU	6
Ore di insegnamento	60
Anno di Corso	Secondo
Semestre	Primo

Brief description of teaching and learning objectives

The course belongs to the traditional disciplinary corpus of studies of Architecture and its name expresses the subject content of Architectural Technology, whose purpose is to study the processes of realization in architecture. The course includes a program that is characterized by a methodology that, tending to produce a preliminary design, final design and a partial experiences of executive planning, ports especially to think about the project.

More general objective is to contribute to the formation of a new culture of construction, which is able to mend the conceptual separation between time and moment of realization.

The course aims to be an application of technological design, built on the rejection of an independent and separate conception of the project; useful to the understanding of "building processes" and how the technological know-how to intervene in the design process. The aim of the course is to gain knowledge of the social role of the designer and the relationships that are established in architectural construction, between form and content, including social and environmental purposes, including use of materials and their performance, the spaces between logic, logic functions and structural reasons.

Prerequisites

In order to take the examination of the course Design of Construction Systems you must have already passed the exam "Materials for Architecture" (1st year of course) because the teachers assume that the student should have already acquired the knowledge refer to the basic technologies of materials, their production cycle and their place in the building process of the final product.

Course program

The teaching activity is articulated through teaching "ex cathedra" on the basic issues and theoretical knowledge and techniques (first phase), and through the mentoring activities for the development of the project (second phase), whose conception must be simultaneously expressed materially and technologically and then to the appropriate depth scale.

In the design process, students are required to pursue some guiding principles with respect to requirements such as:

- Security
- Wellness
- Protection of the environment (use of materials and environmentally friendly products; optimization of the building context, alternative sources of energy)
- Flexibility typological and technological (adaptability, flexibility, integration, accessibility, usability)

- Implementation (speed of construction and assembly, level of prefabrication, adaptability to soil type)
- Management (maintainability and replaceability)
- Reversibility of the process (temporary - transience, recyclability, reusability).

The frequency of the courses will be verified through partial evidence and relate to three levels of activity: analytical-cognitive, elaborative and verification / validation.

Level cognitive-analytic

- the resources (materials, products, traditional and innovative building systems)
- processes and procedures (phases, subjects, organizational models)
- the theme (needs, wants, feasibility, legislation, regulations, cultural references)
- the context (external data morphological and climatic, geological, historical, urbanistic, architectural)

Level elaborative

Interrelations needs / resources / environment and evaluation of design degrees of freedom (the activity tends to produce two different design levels: preliminary - definition of environmental subsystem - and partial experiences of the final / executive - definition of the subsystem technology) .

Level of verification / validation

On the partial processing, and in progress, the course will develop actions of verification / validation based on:

- Relationship building / environment (appropriateness of the choices, minimizing impacts, exploitation of natural resources, etc.).
- Report program / project (translation of the program in terms of construction, dimensional aspects, distribution, performance);
- Report project / construction (relapses constructive options architectural image, classifications, processes, innovations, materials and techniques, drawings)
- Relationship building costs (basic information, calculations, specifications, etc.).

To support these activities will be provided prior teaching materials, with bibliographies, bibliographic-type cards, knowledge of technological systems, material anthology, etc.

Expected Results (acquisition of knowledge by the student)

The aim of the course is to provide the student with the knowledge of the relations in the construction of the architecture are established between form and content, between the social purposes of the environmental transformation and the means offered by the production, including the use of materials and their performance, between the logic of space, the logic of functions and structural reasons, in order to develop the capability to conceive, design and graphically return the key building blocks and their assemblies, verifying the economic and congruences regulations, controlling the role that materials and performing techniques in architectural design, the realization and, more generally, in the programming process-design-production use of an artifact.

Another important objective of the course is to stimulate the ability to design and draw the key building blocks and their assemblies, placing the necessary attention to the appropriateness of the technical choices to achieve the well-being of users, compared to the condition determined by the physical, economic, productive and social and local culture.

Energy saving, reduction of emissions and waste, healthy environment are inseparable objectives by achieving a global quality of the project.

The technical procedures for achieving these objectives, architectural solutions can be very different from each other, the reinterpretation and innovation of materials and traditional technologies, the sandwich construction Cleaning, at the construction site as a "kit" assembly.

Self-employment of the student

Lectures (hours / year in the classroom): 20

Exercises (hours / year in the classroom): 25

Practical activities (hours / year in the classroom): 15

Lavoro autonomo dello studente

The student will study the texts recommended the topics covered in lectures, will draw critically constructive

elements explained in the classroom supporting the drawings with photographic documentation and will have to prepare the Fact Sheets on building components. The graphic must deepen the aspects covered up to the executive project.

Assessment methods

The work produced in the classroom and at home, partly individual, partly developed by groups, will be tested and evaluated periodically, based on states of progress and programmed in a collective manner. Deliveries are scheduled ongoing testing during the year. Checks will be translated into "loans" for passing the exam.

In relation to the topics covered in the modules, the students are asked to perform exercises and partial tests, at intervals to be specified.

To support these activities will be provided prior teaching materials, with bibliographies, bibliographic-type cards, knowledge of technological systems, material anthology, etc..

Verification of the year, aimed at certification of the 8 credits required, consists of an interview, in the reconsideration of the partial assessments and evaluation of the documents produced during the year: exercises, written and graphic, photographic documentation, etc..

Suggested reading materials

Bibliography (max 5 testi)

- AA.VV., *Manuale di Progettazione edilizia*, vol. 1, 2, 3, 4, 5, 6, Milano, Hoepli.
- De Capua A. (a cura di), *Nuovi paradigmi per il progetto sostenibile*, Roma, 2002 Gangemi.
- Mangiarotti A., Paoletti I., *Dall'idea al cantiere, Progettare, produrre e costruire forme complesse*, Hoepli Milano, 2008
- Nardi G., *Tecnologie dell'architettura*, Milano 2001, Clup
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Sitografia di riferimento

Altro materiale didattico



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