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Dipartimento Architettura e Territorio

Corso di Laurea Magistrale a c.u. in Architettura (Classe LM-4 c.u.)

Degree course	Architecture C.U.
Course code	SAR 10
Lecturer	Francesco Pastura
Course name	Materials of Architecture
Disciplinary area	B
Disciplinary field of science	8c/1 (ICAR 12)
University credits - ECTS	6
Teaching hours	60
Course year	1
Semester	1

Synthetic description and specific course objectives

The course contributes to the definition of general and basic knowledge required for the first and the second year of the five-year course of Course of study in Architecture and is a Discipline preparatory to technical control of the project and the construction of Architecture.
On the operational side, its contents and its articulation are dedicated to the critical analysis of the material constitution building. The course belongs to the subject area of Architectural Technology, whose purpose is to study the processes of realization in architecture. One area that, with its original contributions, can give much to the formation of the architect, where the building materials and their technologies for production and employment are the central element of the construction of the artificial environment, one of the determinants of housing production and realization processes. Consequently, this discipline has a leading position within the Path of General Education, taking the transverse support, compared to all the other disciplines that make up the area and the wider domain of the project.

Course entry requirements

Materials for Architecture is an instruction placed in the first year, therefore, has no prerequisites.
The course provides the knowledge and tools needed to tackle the issues of the topics specified.

Course programme

Materials for Architecture is the captivating locution that headline in the course outline that area that is oriented to the design of intelligence that has always governs the path of architectural design that gets built. A combination of knowledge which organizes the corpus of the choices that the architecture project take on so that its shape conquer concreteness.
In that sense, the issues addressed and the educational aims can be expressed through the intake of the following assumptions:

1) The current issues related to the energy crisis, climate change, depletion of natural resources, to increased levels of pollution and waste generation are turning some characters of the evolutionary dynamics of our society and, among them, therefore, also those related to the processes of transformation of the space anthropogenic and natural that, in this sense, are oriented to hire and promote the dissemination of new practices.
2) Tackling the study and teaching of Materials and Techniques, today, is closely interrelated to the increased spread of a feeling of knowledge developed around the themes of the relationship between environmental sustainability, compatible development and transformation of space.
3) To study the technologies of materials identifying this study with the knowledge of the means of their production cycle and their place in the building process of the final product.
4) To consider as a priority the question of the relationship between the architectural organism as a whole, its components, characteristics of the natural environment and the socio-technical context in which it is placed.
5) Define a path of knowledge of the characteristics of the materials, in relation to the problems of stability, protection and durability that the parties are called upon to carry out building.
6) To characterize the study of architectures as a structured set of parts which, though otherwise

marked, must be considered agents in an interactive way.

7) Building an approach to the choice of materials and techniques related to environmental characteristics, assessing their impact, considering the life cycle of materials, from their production to their use, at their disposal.

8) Building a mindset where they are not distinct purposes formal of the architecture from the possibility to realize them through the material, its characteristics and its language.

Expected results

In relation to the topics covered, in order to be able to detect the degree of preparation of the students, also articulated, according to what is defined in the European context, through the five *Dublin Descriptors* related to each other:

- Knowledge and Understanding;
- Applying Knowledge and Understanding;
- Making Judgments;
- Communication Skills;
- Learning Skills;

the same Students are required to carry out exercises and partial tests, according to deadlines to be specified in support of these activities, educational material will be provided in advance, with specific bibliographies, bibliographic cards, fact sheets, anthological material, etc.
The year verification, aimed at certifying the 6 credits provided, consists of an interview, the reconsideration of partial assessments and the evaluation of the documents produced during the year and contained in a Personal Book and related to the in-depth study of the following topics
1. MONOGRAPHIC STUDIES ON BUILDING MATERIALS
2. THE CONSTRUCTION / ENVIRONMENT RELATIONSHIP
3. THE BUILDING / GROUND RELATIONSHIP
4. THE BUILDING / STRUCTURE RELATIONSHIP
5. REALIZATION ASPECTS AND SITE

Course structure and teaching

Lectures *(hours/year in lecture theatre): 45*
Practical class *(hours/year in lecture theatre): 15*
The frequency of the course will be assessed and evaluated through three cycles:

- A cycle training and orientation
  Material culture and the culture of design
- A cycle of knowledge of the behavior of materials in use
  Materials Science as cognitive support
- A cycle training on technical-constructive
  The Construction of Architecture

Material culture and the culture of design
Definitions, classifications, and historical systematization of materials, techniques and utilization of the factors of production; critical principles and design and construction process:
- Culture of materials and design culture: the relationship between matter and form;
- Materials in the history of architecture;
- Materials and evolution of productive factors;
- Knowledge of materials as constitutive factor of the building process;

Materials Science as cognitive support
Materials science as cognitive support is indispensable for the understanding of their behavior and their use in building; relationship between design principles and design choices; esigenziali references to the purposes and principles of performance and sustainability:
- The paths of material information
- The nature of the materials;
- The "quality" of the building materials, the objectives of environmental well-being and sustainability of decisions; analyzes and comparisons between alternative design solutions (classifications, features, performance, from the technical solution that complies to the construction element);
- The technical problems of the confined physical, environmental conditioning for human wellbeing;
- The physical behavior of building materials, in relation to environmental requirements;
- Materials and technological solutions with low impact, reuse, recycling;
- Building materials compared (classifications, characteristics, performance);

The Construction of Architecture
Relationships between housing reasons, materials, construction techniques, and architectural form, appropriate technology, problems of durability, reliability and maintainability:
- The building structure as a system of functions;
- The constituent parts of the body construction;
- The construction process;
- Other classifications constructive apparatus, with reference to industrialized processes;
- The construction process (machinability, ways and means to carry out the construction)
- Design criteria, taking into account the functional requirements, duration and preservation

Student's independent work

The student will study the texts recommended the topics covered in lectures, and summarize the issues addressed by processing their personal elaboration (graphic processing; Texts; photographic documentation; synthetic cards.

Testing and exams

In relation to matters specified in cycles, 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..
The check of the year, aimed at certification of 6 credits provided, consists of an interview, in the reconsideration of the partial assessments and evaluation of the documents produced during the year, summarized in a exercises, written and graphic, photographic documentation, etc.., enclosed in a Personal Book.
The Book will be a sort of "textbook personalized" product direction, including advice on the following training
More in detail, provides the following structure:
- Notes, with summaries, comparison tables and graphs, according to the indexes-specific driving.
- Monographic studies on the materials studied: It involves the production of cards on the materials investigated related to the evolution of the material in the history of architecture; evolution of productive factors; relationships between matter and form; quality of the material; behavior of the material in relation to the tax authorities' environmental needs, environmental friendliness of the material: flows of energy and matter cycles.
- Graphic printouts with drawings, comments and annotations, using graphic conventions "official", referring to the theoretical deconstruction of a theoretical edifice. It provides for the development of various technical alternatives, deducted from manuals and manufacturing community.
The work will be individual and, in part, produced in the classroom. The tests will take place periodically, based on states of progress planned; checks can be translated into partial "credits" useful for the

Suggested reading materials

- **Giachetta A. Novi F. Raiteri R**
  La costruzione dell'idea, il pensiero della materia. Riflessioni sul progetto di architettura Roma 2019, Franco Angeli Editore
- **Campioli A. Lavagna M.**
  Tecniche e Architettura, Novara 2013, Citta Studi Edizioni
- **Nardi G.**
  Tecnologie dell'architettura, Milano 2001, CLUP
- **Nastri M.**
  La costruzione dell'architettura. Strumenti e procedure operative per l'elaborazione tecnica del progetto, Roma 2009, Franco Angeli Editore.
- **Torricelli M. Del Nord R. Felli F**.
  Materiali e tecnologie dell'architettura, Bari 2001, Laterza