



## Dipartimento di Architettura e Territorio – dArTe

### Corso di Studio in Architettura quinquennale – Classe LM-4

Degree course	Architecture U.C.
Course code	ARM81
Lecturer	Francesca Giglio
Course name	Innovative technologies for the project
Disciplinary area	D
Disciplinary field of science	ICAR 12
University credits - ECTS	6
Teaching hours	60
Course year	IV
Semester	I

#### Synthetic description and specific course objectives

The course is part of the disciplinary Architectural Technology and is aimed at the acquisition of specific skills on the design of building systems, components and advanced materials for the building structure, according to criteria of technological innovation and reversibility of construction process and energy self-sufficiency

For the purpose of qualifying the Study Course objectives, it's intend to acquire a method and provide design tools able to cope technological problems and design that characterize the contemporary building and developing innovative technological solutions and realization processes, through theoretical contributions, analysis of case studies, experimental activities through, the technical contributions of companies specialized in the production of high-performance and ecological materials or technical elements.

In line with the skills characterizing the architect generalist (Directive EC 2005/36), basic training objective is to investigate theoretically and operationally related issues, in making architecture, the choices of the use of materials construction of building components and building systems, in relation to aspects closely related to the evolution of construction techniques, reduce consumption, the sustainability and reversibility of manufacturing processes, through a systemic approach to the project.

#### Course entry requirements

It's required the knowledge of the processes and manufacturing processes, in addition to knowledge of the system components and technological aspects of the environmental system, therefore, it will need to have passed Materials for Architecture and Design of building systems examinations. It better to have acquired a knowledge on the fundamentals of Technical Physics.

#### Course programme

The contents of the course, are focused on the relationship between technological innovation and project , with reference to the technological challenges of the new housing arrangements that translate in the concepts of the temporary dwelling and to the impact of construction on the new paradigms related to the reversibility of construction process. "In recent years it has progressively affirmed the concept of reversibility as a feature of a building system to be de-constructed so that the entities technical (materials, elements, components or systems), which is formed can be regarded as still as real resources (and not waste, scraps,) to be reintroduced in a further production process or to replenish the natural environment. The technological type of temporary, favor metal, wood and plastic materials construction systems, not only because of the lightness as a prerequisite for easy movement of the elements, but also the efficiency weight / resistance" (R. Bologna 2008). The scope of reference focuses, therefore, on the description of tools and methods to achieve innovative design activity from the point of view of product technologies and process for a new concept of temporary living, the flexibility of the space, the dynamics evolution of materials and components, to the identification of related building systems and building systems that can be used off-grid, for energy self-sufficiency.

Based on this framework, the joint general class, will cover an initial theory, the general concepts of the

relationship between the different forms of process innovation and product in relation to the current regulatory requirements for energy efficiency and resource savings.

The second part, a more operational, will be devoted to production reality contemporary art through lectures and seminars in collaboration with companies in the sector. Among the issues discussed:

- Technology innovation and building production
- Prefabrication and light construction technologies
- The evolution of performance of component materials for envelope: advanced materials (VIP, TIM, PCM, photo catalytic materials), natural and recycled materials
- Urban microarchitecture: case studies

Each subject will be discussed by describing the evolution of supply and production specific case studies

### Expected results

Students will gain knowledge and specialist skills in particular concerning:

- The critical ability to address the complexity of the relationship between technical choices, innovation and constructive contemporary languages
- Knowledge of tools and strategies for technologies aimed at the professional design practice
- Knowledge of the criteria for selection of materials, products and components in relation to their effects on the environment in a constructive solution.

### Course structure and teaching

Lectures (*hours/year in lecture theatre*): 32

Practical class (*hours/year in lecture theatre*): 20

Practical / Workshops (*hours/year in lecture theatre*):8

The educational activities include, in addition to theoretical lessons, technical seminars by experts / professionals, meetings with companies in the sector.

### Student's independent work

Each credit, will be completed by the specific activity of the student (15 hours per credit), which will cover their own individual study activities, according to the bibliography provided and the directions of teaching. The activity of analysis and research, will be characterized by the preparation of drawings, technical-constructive and thematic dossiers on innovative construction systems and related case studies, in order to build your own logical path / deductive and objectives outlined by the course responsible .

### Testing and exams

The course includes some intermediate tests, useful to arrive at a proper understanding of the final project and necessary to achieve the final exam. The assessment of the level of learning acquired by the student during the whole training will be undertaken in relation to:

- The presence during the theoretical lessons and activities;
- The theoretical knowledge acquired during the course of lessons, verified through an oral test;
- The ability of application of such knowledge through the performance of activities.

The examination includes an oral interview which will be verified in the knowledge of the matters and a discussion of the papers and tutorials, as specified by the teacher during the course.

### Suggested reading materials

- Bologna R. (2002) "La reversibilità del costruire. L'abitazione transitoria in una prospettiva sostenibile" Maggioli Editore, Rimini
- Gaspari J. (2008) "L'innovazione tecnologia e la sostenibilità nelle costruzioni", Edicom (GO)
- Imperadori M., (a cura di) (2006), "La progettazione con tecnologia stratificata a secco". Collana Tecnologia e Progetto, Il Sole 24 ORE, Milano
- Sinopoli N., Tatano V., (a cura di) (2002), "Sulle tracce dell'innovazione. Tra tecniche e architettura", Franco Angeli, Milano
- Zanelli A., Giurdanella V., Superbi G., Viscuso S. (2010) "Assemblage: la libertà costruttiva", Il sole 24 ore, Milano.

The course will also provide bibliographic references and handouts on specific topics

#### Web site:

[www.modulo.net](http://www.modulo.net)-

[www.ediliziainrete.it](http://www.ediliziainrete.it)

[www.edilportale.it](http://www.edilportale.it)-

[www.infobuildenergia.it](http://www.infobuildenergia.it)

#### Specific sector journals:

Arketipo, Azero, Costruire in laterizio, Detail, Modulo, The Plan, Progettare.

#### Manuals:

Gerald Staib, Andreas Dorrhofer, Markus Rosenthal, Atlante della progettazione modulare, Utet scienze tecniche, 2010.