

Degree course:

LM4_Architettura quinquennale c.u.

Course code: 1001147

Lecturer: prof.ssa Consuelo NAVA

Course name: Technological Culture of Environmental Design

Disciplinary area: "Technological and Environmental Design of Architecture"

Disciplinary field of science:
ICAR 12

University credits – ECTS: 6

Teaching hours: 60

Course year: III

Semester: II

Monodisciplinary course: YES

CONTENTS

1 _ Description

The seminar course of the Technological Culture of Environmental Design (CTPA), is to be considered as characterizing and foundational with respect to the training course on the topics of constructability of Architecture and its quality profiles in terms of technical culture, architectural and technological language, innovation and environmental design of resources and performance. Year III teaching of the Architecture degree, founded on the foundational matrices within the subject area of Architectural Technology and Environmental Design. The discipline is included in the Roll of Active Erasmus Courses.

In the course of education, stipulated by teaching regulations and manifesto of studies, the discipline contributes to provide methods and tools for "technical control and to the construction of the architectural project" (cf. art.5/first cycle of the Teaching Regulations) and to provide tools to experience "Methods of investigation and preparation for the construction project, (...) an adequate knowledge of the physical and environmental problems of climate change-sensitive technologies" (cf. art.2 of the Teaching Regulations)

Therefore, the disciplinary contributions of CTPA are also to be considered preparatory and characterizing for the executive design laboratory and project constructability referred to thesis paths.

With reference to the new declaratory of ssd icar/12, methodologies proper to the discipline are assumed to be those founded on : "are based on: design experimentation and feasibility, measurability, replicability of outcomes; systemic, exigency-performance and process approaches; decision-making strategies consistent with objectives of effectiveness, sustainability, circularity" and the revision of the contents for CTPA, as referring " with theoretical and experimental insights into contemporary architectural design culture with interscalar method and the relationship between environmental performance levels and detail design of components in innovative systems, with transfer to prototyping."

2_Course Program

The cognitive and exploratory pathway, conducted through the CTPA, will investigate around three major trajectories and paradigmatic issues of the discipline, contemporary with the debate "on the role of architecture, in its relationship between design and construction, as a process of modifying the built environment and a method of approaching the configuration of complex spaces and systems at all scales of design." 3 questions with reference to the design and implementation of the building as an "integrated system of technologies" and as a "building organism."

The first issue addresses the theme of "complexity of contemporary building," in order to situate the role of the relationship between design and construction, between design and production, between spatial and morphological and technological configurations, instructed by the formed and relational processes between the parts and their conditions of response to the demand for use, service, operation, and recognizability of systems in their final expression.

The second issue, expresses all the characters and terms of the issues of "sustainability as an evolution of environmental design and design of natural resources," rereading the inter-scalar relationship between patterns of operation and response in impacts, between conditions of quality of space referred to the quality and well-being of its use, in the regenerative ability to design systems that increase its performance, with high levels of innovation and physical and life cycle integration, according to the new environmental demands.

The third question, referring to the "role of innovation in the cultural processes of technology," with reference to the complex and sustainable project (first two questions) and with reference to the evolution of the technical and informational culture of the project, the way in which experimentation and research has guided the evolution of the production chains of components, materials, systems, together with the evolution of digital processes in all the realization phases of the process and the project and has made available an increasingly continuous relationship, between process, project and product.

Experimentation is proposed on contemporary architectural buildings made in the last 20 years, internationally, that can be studied and understood through the reproduction of some drawings at the building scale of technological and environmental system, both as a deepening of traced sources and as new proposals in terms of details and operating models. Specifically with reference to the three theoretical and experiential issues referred to in the course syllabus, it is proposed to investigate:

- with reference to Issue I (UT2): the relationship between spatial configuration and structural configuration (closures/supporting structure)
- with reference to Issue II (UT3): the relationship between building operation and integrated systems (systems, passive and positive models, and energy and biophilic envelope design)
- with reference to Issue III (UT4): the relationship between technological and environmental configuration of the building and materials (envelope and environmental profile of materials, off-site and advanced materials integrated with circular profile)

3_Expected Objectives

Each UT includes a pathway for student acquisition of transferred knowledge, for which bibliographic, case study and tutorial guidance will be provided.

At the conclusion of this exploratory pathway, students are asked to acquire the disciplinary terms and issues investigated between lectures, seminars and discussion on the exercises for experimentation.

In particular.

- *Knowledge and comprehension skills* will be practiced through classroom verification of lectures, at the end of each UT with brainstorming activities on key issues and with class involvement (construction of the illustrated glossary)
- *Applied knowledge and understanding skills*, through proposed experimentation on each UT, writing and classroom presentation during the course
- *The 'autonomy of judgment*, through involvement and interaction during seminar activities, with requests for

formulating critical observations and insights in a shared interview

- *Communication skills* through classroom interaction for the midterm tests on the TUs and the final examination paper

- *The ability to learn*, stimulated with the different teaching activities and checked on the bibliography of assigned texts and the search for study insights to carry out the practical activities by each student.

SPECIFIC COURSE OBJECTIVES

In order to promote a path of in-depth study on the themes, of an exploratory nature, in the proposal articulated in the illustrated program, the cognitive method involving theory, design and experimentation will be followed, as an iterative and comprehensive experience for each thematic unit, with the production of thematic graphic works corresponding to each UT and the construction of a glossary of paradigms illustrated on the theoretical lessons.

ACCESS REQUIREMENTS

Students in order to take the discipline exam must have taken the Architecture Technology subject area exams from Years I and II.

TEACHING METHODS

1_ Course structure and teaching

Lectures (hours/year in the classroom):20 h

Exercises (hours/year in the classroom):20 h

Practical activities (hours/year in the classroom):20 h

Other: laboratory activities for 3 D printing of details c/o ABITAlab

Schedule of training activities

The course syllabus is implemented in the first semester, with 12 weeks of activities involving lectures, seminars, applications, tutorials and midterm examinations.

The contents of the program are divided into three Thematic Units, a prologue and program (P) and one final seminar and collective (F)

UT P (lecture and lectures) - The technological culture of environmental design: the discipline, themes and program (Week 1 and 2)

UT 2 (lectures, seminars and experimentation) - (wk 3[^] through wk 5[^])

The complexity of contemporary building (theory, design and experimentation)

UT 3 (lecture, seminars and experimentation) - (wk.6[^] to wk.8[^])

Sustainability as environmental design and resource design (theory, design and experimentation)

UT 4 (lecture, seminars and experimentation) - (Sept.9th to Sept.11th)

Innovation as the quality of high-performance architecture (theory, design and experimentation)

UT F (lectures and collective seminar) - Complexity, Sustainability, Innovation: CTP explorations (week 12)

2_ Autonomous Learning of the student

The student is expected to support the cognitive journey by devoting in-depth hours in researching the case studies to explore, to carry out the guided exercises, corresponding to each proposed thematic unit and with reference to the bibliography and materials indicated. Specifically:

In-depth study/study on bibliography (theoretical part): 35 hrs.

Preparation of examinations (experimentation): 40 h
Examination preparation: 25 h

ASSESSMENT METHODS

Attendance in the course is compulsory and is certified with practice activities at the conclusion of each thematic unit in the syllabus.

0_ classroom tests to verify basic knowledge (construction of personal and class glossary)

1_ mid-term verification on the program on UT 1/UT2 experimentation (Jan. 8-12, 2024)

2_ mid-term verification on the program on UT 3/ final review experimentation (May 13-31, 2024)

The final review for the whole class will be held in the first useful session after the semester of classes.

There will be a collective discussion of personal work at the end of the course, preparatory to and admission to the final exam, with a collective exhibition of work following the oral exam on theoretical content for each student admitted to take the test - (verification of attendance and midterm)

RECOMMENDED TEXTBOOKS

- Theory

Reid E., Capire gli edifici, Zanichelli ed., 1990, Bologna

Nava C., (2012), SED_Sustainable energy design, ListLab, Trento

- Experimental Project – Technical Tools

Grosso M., Peretti G., Piardi S., Scudo G., (2005), Progettazione ecocompatibile dell'architettura. SE ed., Napoli

Nava C., (2012), Edifici Sostenibili. Particolari Costruttivi (MANUALE), DEI ed., Roma

- Topic and Technical Informations

Campioli A., Lavagna M., (2013), Tecniche e Architettura, CittàStudi ed., Novara

Nava C., (2019), Sezioni Sostenibili. Design e Informazioni per il progetto ipertesto, Aracne ed., Roma

More Informations:

+ Reports and papers on course topics

+ Other industry bibliography to support lectures, seminars and tutorials.

+ Recommended industry journals and open source digital programs for use tools (Arketipo series (selected issues for case studies))