ADVANCED TECHNICAL STUDIES

Bachelor in Architectural Studies BAS SEP-2023 ATS-AS.5.M.A

Area Architecture and Design

Number of sessions: 50

Academic year: 23-24

Degree course: FIFTH

Number of credits: 9.0

Semester: 2º

Category: COMPULSORY

Language: English

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Rafael Iñiguez de Onzoño holds a BArch by the School of Architecture in Madrid (1992).

Throughout his career he has worked with various architectural offices and is currently partner at Estudio Iñiguez de Onzoño, where he has developed projects for both public Administration as well as the private sector in a wide range of areas, both in new construction and rehabilitation, based on the understanding that building architects are part of a multidisciplinary team, wich allows them to take on more complex programs. Exploring how to reconcile seemingly contradictory categories such as global tendencies and local realities, he has worked both in Spain and abroad, with projects and buildings in Berlin, Malabo, Bata, Rabat and Astana, among others, highlighting The Spain´s Embassies at Germany and Ecuatorial Guinea, the rehabilitation of Bank of Spain headquarters in Lérida and Cuenca, or the Finance Ministry of Spain Data Center in Madrid. During his professional career has also worked in both construction companies and developers.

He is associated professor at the IE School of Architecture and Design in the IE University, and he has given courses and lectures at several schools of Architecture and Interior Design, and has taught in subjects related to Life cycle costing in construction and Typologies. Recently has been in charge to write the “Guia de Asistencia Técnica: La Dirección de obra”, comissioned by the COAM.

Office Hours

Office hours will be on request. Please contact at:

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SUBJECT DESCRIPTION

Summary of course contents

Advanced Technical Studies is aimed at effectively integrating all techincal components of architecture into the architectural design process. Students are challenged to further their technical knowledge by exploring advanced scenarios and design where a hollistic consideration of the project, with careful attention to technical issues, sustainability, The Technical Building Code, is required for an effective resolution. The course identifies 6 core elements that must be addressed in this integrated design process:

1. Site context;
2. Building structures and foundations;
3. Sustainability and building lifecycle.
4. CTE (Building Technical Code)
5. Environmental strategies and building services;
6. Construction system. Syntax and details.

Students will gain profficiency in all core elements. A hands-on learning methodology is employed:

earlier learnings are mobilised and expanded through core lectures, individual investigation and direct application to an individual design project that runs throughout the module

and is shared with the 5th Year design studio. The building code CTE is suitably explored and applied as a necessary step in the design. A project diary will be build up through the course,

alongside necessary models, diagrams and analysis. The final design will be presented through precise documentation, including architectural drawings and a descriptive technical report.

Course working materials

1. Project diary

Students will keep a project design diary updated on a weekly basis, where research, design ideas and discussions are clearly recorded. The aim of this Project Diary is twofold: first, to act as record keeping of discussions with course tutors and serve as prompt for individual work; and second, to provide an overview of the design journey that can be revisited to understand the design approach and methodology. The Project Diary will be submitted in A3 Pdf format at the end of the course.

2. Drawings

The technical elements of the architectural design will be presented through a set of accurate drawings, including layouts, sections, elevations, details and axonometrics as required to inequivocally describe the project. Early versions of the drawings will be discussed at a mid-term review. Final submission of a complete set of drawings will be required at the end of the course.

3. Technical Report

As per the CTE, students will be asked to produce a technical report that describes and justifies all relevant aspects of their design. The technical report will be submitted together with the final working materials at the end of the course.

4. Models and design aids

Alongside the descriptive working materials, students will be encouraged to produce both physical and analytical models aimed at supporting and detailing their design. These materials will be discussed in seminars and micro-workshops. Furthermore, students should described them in their mid-term review and Project Diary.

LEARNING OBJECTIVES

BASIC AND GENERAL OBJECTIVES

- CB1: Students have demonstrated knowledge and an understanding of a given area of study, building upon the foundation of secondary education, supported by advanced texts, and including aspects that engage the latest advances in their area of study.

- CB2: Students know how to apply their knowledge professionally to their work or vocation and possess the competencies that are often demonstrated through elaboration and defense of arguments and the resolution of problems within their area of study.

- CB3: Students can gather and interpret relevant facts (usually within their area of study) in order to make judgments that include reflection on relevant social, scientific, and ethical topics.

- CB4: Students can transmit information, ideas, problems, and solutions to both specialized and non-specialized audiences.

- CB5: Students can transmit information, ideas, problems, and solutions to both specialized and non-specialized audiences.

- CB6: Students have developed the necessary learning skills to continue their studies with a high degree of autonomy.

- CG4: An understanding of the fundamental issues in structural design, construction, and

engineering as related to building projects, as well as the techniques used to address these issues.

- CG5: Knowledge of the issues related to building physics, technologies, and programmatic uses, in order to create buildings that provide internal comfort and protection from the elements.

- CG6: Knowledge of the industries, organizations, regulations, and procedures needed in order to transform projects into buildings, and to integrate drawings into the planning process.

SPECIFIC COMPETENCIES

Per the Ministerial Decree EDU/2075/2010, 29 of July:

TECHNICAL MODULE (CE 12-33)

(W: Workshop Format)

- CE12: Ability to devise, calculate, design and implement foundation solutions, and to integrate them into buildings and urban assemblies (W).
- CE13: Ability to apply technical and constructive codes and regulations.
- CE14: Ability to preserve building structures, foundations and public works.
- CE15: Ability to preserve finished work.
- CE16: Ability to create cost estimates for built work.
- CE 17: Capacity to develop, calculate, design, and execute building structures, and to integrate them into buildings and urban complexes (W).
- CE18: Capacity to develop, calculate, design, and execute interior partitions, carpentry, stairs and other finished work, and to integrate them into buildings and urban complexes (W).
- CE19: Capacity to develop, calculate, design, and execute enclosure systems, roofs/coverings, and other structural work, and to integrate them into buildings and urban complexes (W).
- CE20: Capacity to develop, calculate, design, and execute the supply, treatment, and drainage of heating and cooling fluids, and to integrate this into buildings and urban complexes (W).
- CE21: Capacity to preserve structural work.
- CE22: The capacity to design building and urban installations of electrical transformation and power supply, audiovisual communication, acoustic conditioning, and artificial lighting.
- CE23: The capacity to preserve mechanical and electrical systems.
- CE24: Adequate knowledge of the mechanics of solids, continuous media and soil, as well as the plastic, elastic, and resistance qualities of heavy building materials.
- CE25: Adequate knowledge of conventional construction systems and their pathology.
- CE26: Adequate knowledge of the physical and chemical characteristics of the production process, the pathology, and use of building materials.
- CE27: Adequate knowledge of industrial construction systems.
- CE28: Knowledge of professional ethics, professional organizations, professional structures and civil liability.
- CE29 Knowledge of administrative and management procedures and professional processes.
- CE30: Knowledge of general office organization.
- CE31: Knowledge of techniques for measurement, budgeting, and evaluation.
- CE32: Knowledge of project safety and hygiene on site.
- CE33: Knowledge of real estate management.

TEACHING METHODOLOGY

IE University teaching method is defined by its collaborative, active, and applied nature. Students actively participate in the whole process to build their knowledge and sharpen their skills. Professor's main role is to lead and guide students to achieve the learning objectives of the course. This is done by engaging in a diverse range of teaching techniques and different types of learning. The course is structured around the integration and development of all technical components of architecture into an individual architectural design project. Teaching is carried out through a progression of core lectures and group workshops, followed by small seminars and microworkshops to support students advance with their individual design project. This is reflected in the course structure, with two distinct blocks:

Part 1: Theory and Research. The six core technical elements are explored through a series of core lectures (including guest speakers from industry and academia) and individual reviews at the start of the course. These sessions will foster independent research and exploration of complex technical aspects that must be integrated into the architectural design process.

Part 2: Guided individual design. The latter part of the course will comprise supervised individual design supported through small group seminars and individual micro-workshops.Students will be asked to keep a Project Diary throughout the course. A mid-term evaluation will be based on an individual oral presentation that describes the preparatory research and early stages of the individual design. At the end of the course students will define their technical design through a set of architectural drawings and a technical report, which they will submit alongside the Project Diary.

Learning Activity	Weighting	Estimated time a student should dedicate to prepare for and participate in
Lectures	4.44 %	10.0 hours
Discussions	20.0 %	45.0 hours
Group work	6.67 %	15.0 hours
Individual studying	68.89 %	155.0 hours
TOTAL	100.0 %	225.0 hours

PROGRAM

SESSIONS 1 - 4 (LIVE IN-PERSON)

Core Content: Introductory workshop. Site context. (DS+ATS)

An interactive workshop will address the in-depth exploration of the design context and how to interpret available material, technical and energy resources that can be an integral part of the architectural design project. Within the context, we will look at (but not exclusively):

- Location, site history, tangible and intangible heritage
- Available construction practices and technologies
- Material and energy resources
- Natural context and biodiversity
- Topography, geology and hydrology
- Land use and transport infrastructure

SESSIONS 5 - 7 (LIVE IN-PERSON)

Core Content: Building structures and foundations.

The morphology of the building structure and its integration within the architectural design process will be explored through a core lecture. This will be followed by a research-based workshop aimed at conceptualising the structural and foundation system for an architectural design. Departing from the exploration of the site performed in the first sessions, working in small groups the students will focus on strategies for investigating structural systems and materials that respond to the given context, understanding the structural system as a fundamental component of the architecture worthy of deep attention and investigation.

SESSIONS 8 - 10 (LIVE IN-PERSON)

Core Content: Sustainability and Building lifecycle.

In the current context of the climate emergency, sustainability and building lifecycle are becoming important factors in architectural design. A core lecture will present key concepts in relation to assessing and planning for the building sustainability and lifecycle, including sustainability rating systems, carbon lifecycle assessment and adaptation/reuse strategies that enable designs to transition from cradle-to-grave to cradle-to-cradle.

A workshop will follow to support students identify sustainability opportunities and strategies for their individual designs, embracing the conditions and challenges presented by their specific contexts.

SESSIONS 11 - 13 (LIVE IN-PERSON)

Core Content: Building Technical Code (CTE)

A core lecture will address essential questions pointed in the Spanish Building Technical Code.

CTE Consists in the basic quality requirements that buildings must comply with refer to safety matters (structural safety, fire safety, safety of use) and habitability (health, protection against noise and energy savings).

A workshop will follow unfolding how to justify compliance with these requirements, understand the procedures proposed in CTE, or explore alternative solutions that could be adopted.

SESSIONS 14 - 16 (LIVE IN-PERSON)

Core Content: Environmental Strategies and Building Services

These sessions will look at strategies for integrating complex building services into the architectural project through a core lecture, followed by a group workshop. The sessions are aimed at exploring the following:

- Energy strategies
- Lighting strategies
- Ventilation
- Acoustics
- Water use and management

SESSIONS 17 - 19 (LIVE IN-PERSON)

Mid-term review 1 (DS+ATS): students deliver individual oral presentations in front of a panel of academics and designers, who will offer feedback and guidance to support progress with the design.

SESSIONS 20 - 22 (LIVE IN-PERSON)

Core Content: Construction system

This workshop will present essential questions that must be resolved in the design of construction systems, with a focus on embracing environmental performance and sustainability. A follow-up small group seminar will give students a forum for discussing construction system design opportunities in relation to their individual design projects and in connection with their specific context. Focus will be placed on passive performance, building envelope design and fabrication processes.

SESSIONS 23 - 25 (LIVE IN-PERSON)

Core Content: Construction system

SESSIONS 26 - 28 (LIVE IN-PERSON)

Core content: Syntax

This workshop will be focused on the analysis of different elements present in the envelope, as well as the connections and compatibilities between materials and systems. Discussion of detailed design and production of documentation.

SESSIONS 29 - 31 (LIVE IN-PERSON)

Core content: Syntax

SESSIONS 32 - 35 (LIVE IN-PERSON)

Integration workshop (DS+ATS)

The integration of technical considerations seen through the six core elements of the course into the initial design concept, will be discussed in this workshop.

SESSIONS 36 - 38 (LIVE IN-PERSON)

Micro-worskshop to review and building on knowledge for individual design projects

SESSIONS 39 - 42 (LIVE IN-PERSON)

Class discussion to review progress and sum up final course considerations

SESSIONS 43 - 46 (LIVE IN-PERSON)

Class discussion to review progress and sum up final course considerations

SESSIONS 47 - 50 (LIVE IN-PERSON)

Final review 2 (DS+ATS): students deliver individual oral presentations in front of a panel of academics and designers, who will offer feedback and guidance to support progress with the design.

EVALUATION CRITERIA

Evaluation of the course will be carried out through an early context-study (in pairs), an individual mid-term oral presentation and review and an individual final submission of course working materials. Evaluations will be based on three criteria:

1. Design process and integration.
2. Technical design quality.
3. Technical design definition.

criteria	percentage	Learning Objectives	Comments
Final Exam	0 %		
Individual presentation	25 %		Mid Term Review
Group Presentation	0 %		
Individual work	75 %		Final Submission of Technical Documentation
Group Work	0 %		
Class Participation	0 %		
Intermediate tests	0 %		
Other	0 %		

RE-SIT / RE-TAKE POLICY

BIBLIOGRAPHY

Compulsory

- Andrea Deplazes. *Constructing Architecture. Materials Processes Structures.* Birkhausser.. ISBN 3764386312 (Digital)

Recommended

- Alejandro Zaera-Polo; Jeffrey Anderson.. (2020). *The ecologies of the building envelope. A material history and theory of architectural surfaces.* ACTAR. ISBN 1948765187 (Digital)

Digital

BEHAVIOR RULES

Please, check the University's Code of Conduct here. The Program Director may provide further indications.

1.Be on time: Students arriving more than 5 minutes late to lectures, workshops and tutorials will be marked as “Absent”. If you are late to a tutorial you might loose your opportunity to discuss with the course tutors.

Only students that notify in advance in writing that they will be late for a specific session may be granted an exception (at the discretion of the professor).

2.Do not leave the room during lectures: Students are not allowed to leave the room during lectures. If a student leaves the room during lectures, he/she will not be allowed to re-enter and, therefore, will be marked as “Absent”.

Only students that notify that they have a special reason to leave the session early will be granted an exception (at the discretion of the professor).

3.Do not engage in side conversation during lectures and presentations. As a sign of respect toward the person presenting the lecture (the teacher as well as fellow students), side

conversations are not allowed. If you have a question, raise your hand and ask it. It you do not want to ask it during the lecture, feel free to approach your teacher after class.

4.If a student is disrupting the flow of the lecture, he/she will be asked to leave the classroom and, consequently, will be marked as “Absent”.

ATTENDANCE POLICY

Please, check the University's Attendance Policy here. The Program Director may provide further indications.

ETHICAL POLICY

Please, check the University's Ethics Code here. The Program Director may provide further indications.