1. BASIC INFORMATION

Course	Construction I: Systems
Degree program	Bachelor's Degree in Fundamentals of Architecture
School	School of Architecture, Engineering, Science and Computing
Year	First Year
ECTS	6
Credit type	Basic
Language(s)	English
Delivery mode	Face to face
Semester	First
Academic year	2025-26
Coordinating professor	Alvaro Galmés

2. PRESENTATION

This course presents part of the knowledge that the architect must acquire in the field of construction. It is therefore a first contact with the goal of gaining a global vision of the facts about construction and a steady plan that facilitates the development of building techniques in later courses. Through reflection on the work setting and the available technology, the aim is to bring the student closer to the material nature and technological processes that architecture entails.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB1: That students have demonstrated knowledge and understanding in a field of study that is based on general secondary education, at a level which, although supported by advanced textbooks, imply some knowledge of the latest advances in their field of study.
- CB2: That students can apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defence of arguments and the resolution of problems within their area of study.
- CB3: That students have the ability to gather and interpret relevant data (usually within their field of study) to make judgements that include reflection on relevant social, scientific or ethical issues.
- CB4: That students can communicate information, ideas, problems and solutions to both the specialist and non-specialist.

- CB5: That students have developed the necessary learning skills to undertake further studies with a high level of autonomy.
- CG4: Understanding of the structural design, construction and engineering problems associated with building design.
- CG5: Knowledge of physical problems and technologies and of the function of buildings so as to provide them with internal conditions of comfort and protection against climatic factors.
- CG6: Knowledge of the industries, organisations, regulations and procedures involved in translating design concepts into buildings and integrating plans into overall planning.

Cross-curricular competencies:

- CT1: Responsibility: aptitude or capacity to face responsibility that the profession of architect has in society, particularly when elaborating projects that take into consideration social and environmental factors.
- CT2: Self-confidence.
- CT3: Awareness of ethical values: ethical commitment, which includes the understanding and knowledge of the rights and duties of individuals and professional people, fostering respect for human rights, the protection of the most vulnerable members of society and respect for the environment.
- CT4: Communication skills in the native language (both oral and written) and in the English language, in accordance with the principles of the Universidad Europea de Madrid, any concept or specification for the development of the regulated profession of architect. This includes learning the specific vocabulary of the degree as well as the ability to manage information.
- CT5: Interpersonal skills.
- CT6: Flexibility.
- CT7: Teamwork: ability to work in teams of architects, or in interdisciplinary teams (with shared responsibility in many cases), managing and planning work groups that are necessary in the scheme of competences and tasks that are defined for projects of a certain scale, in which several disciplines converge. This ability includes skills for interpersonal relations and team leadership.
- CT8: Initiative and the spirit of an entrepreneur, both in the area of architecture as well as in business.
- CT9: Planning and time management: ability to plan work in order to comply with delivery times and to respect the limits imposed by budgets and building codes.
- CT10: Innovation and creativity: creativity, imagination and aesthetic sensitivity applied to design in order to satisfy both aesthetic and technical demands. This competence includes critical reasoning and historical culture.

Specific competencies:

- CE12: Ability to conceive, calculate, design, integrate buildings and urban units and execute building foundations.
- CE18: Ability to conceive, calculate, design, integrate in buildings and urban units and execute interior partition walls, carpentry, stairs and other finished work.
- CE19: Ability to conceive, calculate, design, integrate in buildings and urban units and execute exterior walls and cladding, roofing and other structural work.
- CE25: Knowledge of conventional building systems and their pathologies.
- CE28: Knowledge of the code of ethics, the structure of the profession, the organisation of the professional association, and civic responsibility.

Learning outcomes:

- RA1: Has mastered the basic vocabulary of construction and how to apply it correctly in the different aspects of the project, the building and its possible pathologies.
- RA2: Has learned to observe an architectural work from the point of view of its constructive material nature and to identify the criteria by which the architect decides such material nature.
- RA3: Understands the basic processes involved in architectural construction.
- RA4: Knows the different systems of a building (structure, envelope, interior partitions and MEPs) and understands how they relate to each other.
- RA5: Has the necessary skills to identify the different milestones in which a construction work is divided, as well as the necessary order in which these have to be carried out.
- RA6: Has the ability to properly assess the characteristics that the different construction systems involved in the execution must have in order to optimize the construction process and the proper functioning of the finished work.
- RA7: Has the ability to communicate and graphically represent solutions and constructive processes.

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CE25, CE28, CT2, CT4, CG4, CB1, CB2, CB4	RA1
CE12, CE18, CE19, CT1, CT5, CT6, CG4, CG6, CB1, CB2, CB3	RA2
CE25, CT1, CT9, CG4, CB2	RA3
CE12, CE18, CT7, CT9, CG5, CG6, CB4	RA4
CE25, CE28, CT7, CT9, CG4, CG6	RA5
CE18, CE19, CT1, CT4, CT5, CT6, CG4, CG6, CB1, CB2, CB3	RA6
CE12, CE13, CE17, CE21, CT4, CT10, CB4	RA7

4. CONTENT

LEARNING UNIT 1: INTEGRATION
1.1 Introduction to building. Habitability and external protection
1.2 Construction systems
1.3 Constructive Techniques and products
1.4 Construction process
1.5 Buildings components

LEARNING UNIT 2: SYSTEMS
2.1 Structural principles
2.2 Structural systems
2.3 Envelopes
2.4 Roofs

2.5 Building services (MEP)
2.6 Interior spaces

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Lectures
- Guided studies, practical exercises and problem solving
- Presentation of projects
- Independent study/work
- Tutorials, academic monitoring and assessment
- Team work.

6. LEARNING ACTIVITIES

The following table shows, for each learning activity: i) the total time the student will spend; ii) the course policy about the use of Artificial Intelligence (AI) in that activity.

Campus-based mode:

Learning activity	Total time	Use of AI
Lectures	25 h	Allowed
Guided studies, practical exercises and problem-solving	50 h	Allowed
Team work	12.5 h	Assessed
Independent study/work	37.5 h	Promoted
Tutorials, academic monitoring and assessment	25 h	Allowed
TOTAL	**150h**	

Further details about the use of IA policy will be published through the virtual campus platform once the course has started

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Practical activities	70%
Exams	30%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 4.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In any case, you will need to obtain a grade of at 4.0 in the final exam in order for it to count towards the final grade along with all the grades corresponding to the other activities.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Activity 1	Weeks 1-7
Exam 1	Week 7
Activity 2	Weeks 7-16
Exam 2	Week 16

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The recommended Bibliography is:
General Concepts

- ALLEN, E.; YANO, J. Fundamentals of Building Construction: Materials and Methods. Ed. Wiley, 2008.

- BROOKES, A.J.; POOLE, D. (eds.). Innovation in Architecture: A Path to the Future, Ed. Taylor & Francis, 2004.
- ALLEN, E.; IANO, J. Fundamentals of Building Construction: Materials and Methods, Ed. John Wiley & Sons Ltd, 2008.
- WESTON, R. Materiales, Forma y Arquitectura, Ed. Blume, 2003.
- HEGGER, M. Construction Materials Manual, Ed. Birkhauser, 2006.
- TORROJA, E., Razón y ser de los tipos estructurales. Madrid: Ed. C.S.I.C., 1991.
- ARAUJO, R., La arquitectura como técnica (I): superfícies. Madrid: Ed. ATC Ediciones, 2007.

Concrete:

- F. CASINELLO, Fernando: Hormigonería, Madrid: Ed. Rueda, 1996.
- CALAVERA, J., Manual detalles constructivos obras de hormigón armado, Madrid: Ed. Intemac, 2004.

Steel:

- HART, F.; AAVV. El Atlas de la construcción metálica, Barcelona, Gustavo Gili 1976. (fuera de catálogo, pedir extracto).
- ARAUJO, R., SECO, E. Construir arquitectura en España en Acero. Pamplona: Ed. Ensidesa (Aceralia), 1994.
- HURTADO MINGO y otros: Estructuras de acero en edificación, APTA, 2008.

Wood

- Nevado, M. Diseño Estructural en Madera, Madrid: Ed. AITIM, 1999.
- Herzog, T.; AAVV. Timber Construction Manual, Munich: Ed. Birkhäuser - Detail, 2004.

Brick

- KUMMER, Robinson M. Masonry construction. Basel, Switzerland: Birkhäuser; 2007.

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.