1. BASIC INFORMATION

Course	Construction III: Structures
Degree program	Bachelor Degree in Architecture
School	Architecture, Engineering, Science and Computation
Year	Third
ECTS	6 ECTS (150 hours)
Credit type	Mandatory
Language(s)	English
Delivery mode	In campus
Semester	First
Academic year	2025-26
Coordinating professor	José Jurado Egea

2. PRESENTATION

The goal of this subject is to develop constructive skills, acquiring the abilities to design and detail the building structure, in order to habilitate the student to incorporate this knowledge into an integrated architectural design.

The course includes a high diversity of structural typologies, introducing concepts and analyzing singular elements in specific lessons, and incorporating specific case studies of projects that stand for ultimate examples of architectural and technical innovation.

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 vanguard of their field of study.
- **CB2**: That students can apply their knowledge to their work or vocation in a professional way and have competences that can be displayed by means of elaborating and sustaining arguments and solving problems in their field 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.

General competencies:

- **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.
- **CG7**: Understanding of the relationship between people and buildings, and between these and their environment, and of the need to relate buildings and the spaces to human needs and scale.

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: Communicative skills** in the native language (both oral and written) and in the English language, in accordance with the principles 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 come together. 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 the design in order to satisfy the both the 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.
- **CE13**: Ability to apply technical and construction standards and regulations
- **CE16**: Ability to evaluate construction works.
- **CE17**: Ability to conceive, calculate, design, integrate buildings and urban units and execute building structures

Learning achievements:

- **LO1**: Analyze the structural solutions in projects and their implementation at the work site.
- **LO2**: Apply technical standards to the construction process and produce documents on the technical specifications of the procedures and methods.
- **LO3**: Understand the techniques and construction processes of structures.
- **LO4**: Differentiate and evaluate the characteristics of the various materials that intervene in the execution of structures in construction.
- **LO5**: Execute masonry, reinforced concrete, metallic and wooden structures.
- **LO6**: Relate the actions between structures and stress and structural forms.

- **LO7: Communicate and represent graphically structural solutions and details**

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

Competencies	Learning outcomes
CE12, CE17, CT10, CG4, CB1, CB5	LO1 - Analyse the structural solutions in projects and their implementation at the work site
CE12, CE13, CE16, CE17, CE21, CT01, CT03, CT5, CT06, CT07, CT09, CG6, CB2	LO2 Apply technical standards to the construction process and produce documents on the technical specifications of the procedures and methods
CE13, CT01, CB3	LO3: Understand the techniques and construction processes of structures
CE12, CE16, CE17, CT02, CT03, CG5	LO4: Differentiate and evaluate the characteristics of the various materials that intervene in the execution of structures in construction
CE12, CE17, CE21, CT01, CT03, CT5, CT06, CT07, CT08, CT09, CT10	LO5: Execute masonry, reinforced concrete, metallic and wooden structures
CE12, CE17, CT01, CT02, CT03, CT10	LO6: Relate the actions between structures and stress and structural forms
CE12, CE13, CE17, CE21, CT04, CT10, CB4	LO7: Communicate and represent graphically structural solutions and details

4. CONTENT

Unit 1. Frames

1.1 Frames. General Design. Concepts. Linear Elements.

1.2 Frames. Details. Steel. Concrete. Sections. Joints.

Unit 2. Blocks

2.1 Residential and office blocks. Structural types. Global Stability, Foundations.

Unit 3. Slabs

3.1 Slabs. General Design. Concepts.

3.2 Slabs. Details Steel. Timber. Concrete. Types. Details.

5. TEACHING-LEARNING METHODOLOGIES

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

- This subject implements the following academic methodologies:
- Lectures, site visits, trips and conferences.
- Problem based learning.
- Applied practice.
- Collaborative learning
- Workshops

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Learning activity	Number of hours	Use of IA
Master lectures/classes	25h	Allowed
Guided studies, practical exercises, problem-solving	50 h	Allowed in specified activities
Inclusive approach to working groups	12,5 h	Promoted in research
Independent study	37,5 h	Promoted in research
Tutorials, activities follow-up and review	25 h	Not allowed
TOTAL	**150 h**	

Further details on the AI-use 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:

Assessment system	Weight
Test (4)	36%
Case studies (2)	56%
Reports (2)	8%

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

The assessment will be ongoing, evaluating the student´s progress throughout the semester by tracking the development of individual and team works, exercises and research, including in each grade the participation in the classroom. Attendance and punctuality for activities and submissions is compulsory.

Average grade will be obtained from the individual grades and the specified percentage (minimum grade 4,0 in any activity):

- **Theory**: Four tests (T1 to T4) will be held, resulting in an arithmetic average grade. In the second exam or Extraordinary call a maximum of two tests can be redone (to resit failed tests or in order to raise the average grade). If the number of failed or unattended tests are excessive to reach an average grade of 5,0, the student must opt for the Global exam in the Extraordinary call.
- **Case studies**: two different case studies will be developed in teams of two, with different grade percentage. Every intermediate submission of ongoing work must be satisfied in time. In the Extraordinary call only Case study 1 or 2 can be redone individually (with a new brief).
- **Reports**: both reports on BIM models must be fulfilled during the course as they can not be redone in Extraordinary call.

NP ("no show" in Spanish) applies when no test or submission has been fulfilled by the student.

7.2. Second exam period

Extraordinary Call can be attended in two modalities: A. "complete" by redoing the items regulated in the previous chapters, or B. "global" (assessment is unrelated to any of the previous course evaluations) consisting in a global exam and a global construction project (50% each, min. grade 4,0 in any of both).

8. SCHEDULE

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

Assessable activities	Deadline
Activity 1 FRAMES. Design TEST	Week 5
Activity 3 Case study 1	Week 1 to 5
Activity 3 Case study 2	Week 5 to 17
Activity 4 FRAMES Detailing. TEST	Week 7
Activity 5 SLABS. Design. TEST	Week 11
Activity 6 SLABS. Detailing. TEST	Week 14
Activity 7 Model BIM	Asynchronous

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

They following list suggests a valuable bibliography for the course:

- DEPLAZES, Andrea (Ed.): Constructing Architecture. Materials, Processes, Structures. A Handbook. Birkhäuser, 2008 [ISBN: 978-3-7643-8631-2]
- Allen, E. y Zalewski, W. Form and Forces, Designing efficient, expressive structures. New Jersey: Wiley and sons, 2010.
- Schlaich, J. y Bergermann, R.: Light Structures. Munich: Prestel, 2003.
- T. Herzog, et al.: Timber Construction Manual, Munich, Birkhäuser ed. Detail, 2004. http://www.detail.de/rw_5_Kaufen_Es_HoleArtikelID_654_ArtikelDetails.htm

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 inclusion of students 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 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.

WORK PLAN FOR THE COURSE

HOW TO COMMUNICATE WITH YOUR PROFESSOR

Whenever you have a question about the content or activities, don't forget to post it to your course forum so that your classmates can read it.

You might not be the only one with the same question!

If you have a question that you only want to ask your professor, you can send him/her a private message from the Campus Virtual. And if you need to discuss something in more detail, you can arrange an advisory session with your professor.

It's a good idea to check the course forum on a regular basis and read the messages posted by your classmates and professors, as this can be another way to learn.

SCHEDULE ACTIVITIES

This table shows the delivery deadline for each assessable activity in the course, as well as the submission dates:

2024-25							
	Wednesday			Friday			
11-sep.	Presentation	**FRAMES DESIGN >**	13-sep.	**FRAMES DESIGN >**	**CS 1**		CS1
18-sep.	**CS 1**	**CS 1**	20-sep.	*frames design1*	**CS 1**		
25-sep.	*frames design2*	**FRAMES Detail Steel >**	27-sep.	*frames steel1*	**CS 1**		
2-oct.	*frames steel2*	**FRAMES Detail Concrete >**	4-oct.	*frames concrete1*	**CS 1**		
9-oct.	*frames concrete2*	**CS 1**	11-oct.	**CS 1**	**CS 1**		
16-oct.	FRAMES DESIGN	**CS 1**	18-oct.	**CS 1**	**CS 1 > CS2**		CS2
23-oct.	Blocks	**SLABS DESIGN >**	25-oct.	slab design 1	**CS 2**		
30-oct.	*slab design 2*	**SLABS Detail Timber >**	**1-nov.**	**holiday**			
6-nov.	FRAMES DETAILING	**CS 2**	8-nov.	*slab timber 1*	**CS 2.1**		
13-nov.	*slab timber 2*	**SLABS Detail Steel >**	15-nov.	*slab steel 1*	**CS 2.2**	INT	
20-nov.	*slab steel 2*	**SLABS Detail Concrete >**	22-nov.	*slab concrete 1*	**INT**		
27-nov.	*slab concrete 2*	**INT**	29-nov.	SLABS DESIGN	**INT + 2h History**		
4-dic.	**INT**	**INT**	**6-dic.**	**holiday**			CS2
11-dic.	SLABS DETAILING	**CS 2**	13-dic.	History visit to Escorial			
18-dic.	**CS 2.3**	**CS 2.3**	20-dic.				
25-dic.	Xmas		**27-dic.**	Xmas			
1-ene.			**3-ene.**				
8-ene.	**CS 2**		10-ene.	**CS 2.4**			
15-ene.	**CS 2.5**		17-ene.	**CS 2.6 FINAL: 18.01 submission > 19.01 presentation**			
22-ene.	*no class*		24-ene.	*no class*			

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.

DESCRIPTION FOR ASSESSMENT ACTIVITIES

These are the activities that will be graded in this subject:

- **Theory**: 4 tests (T1 to T4) will be held, resulting in an arithmetic average grade. In the second exam or Extraordinary call a maximum of two tests can be redone (failed tests or in order to raise the average grade).
- **Case studies**: an integration activity and two different case studies will be developed, individually or in teams, with different and increasing grade percentage. Every intermediate submission of ongoing work must be accomplishied in time. In Extraordinary call only one case study can be redone.
- **Reports**: both reports on BIM models are asyncroneus activities (students fulfill them on their own wit help of the teacher´s instructions on video) and must be fulfilled during the course as they can not be redone in Extraordinary call.

RUBRIC FOR TEAMWORK ASSESSMENT

ASSESMENT CRITERIA FOR TEAMWORK SKILL

INDICATORS	1	2	3	4
Assignment has been fulfilled	Work does not correspond to the predefined goals or is not done.	Work has too many deficiencies	Work is satisfactory.	Work is **outstanding** and a **significant input** to the global team´s work.
Work is accomplished always in time	He/she is in delay, impairing the team.	He/she is in delay but not impairing the team.	Submission always in time.	He/she **anticipates** the deadlines so to **promote discussion** on the assignment with the team
Work environment	He/she does not listen to the team member´s contributions, disqualifying and systematically imposing his/her opinions.	Occasionally does not listen, declines others opinions and prefers always huis/her own points of view.	Promotes good work environment, collaborating, and listening to other, without disqualifications nor pressures.	Promotes **optimized** work environment, **enhancing collaboration** between team members, **accepting** proposals and **integrating** the opinion of the rest of the team, making them feel valuable and important.
Organization and distribution of assignments	Does not collaborate in the organization and distribution of team´s works.	He/she just accepts his dues, without other implications.	Participates in the organization and distribution of assignments.	**Assumes** the organization and distribution of assignments and does it very **efficiently.**

PLAGIARISM REGULATION

In accordance with the current student disciplinary regulations at Universidad Europea:

- Plagiarism, in full or in part, of intellectual works of any kind, is considered a very serious offense.
- Very serious offenses relating to plagiarism and the use of fraudulent means to pass assessment tests shall result in exclusion from the exams for the relevant period, as well as the inclusion of the offense and its details in the student's academic record. For more information you can find all information regarding disciplinary regulations at the following link: https://universidadeuropea.com/conocenos/normativa/