Teaching Guide				
Identifying Data				2023/24
Subject (*)	Construction 5		Code	630G02033
Study programme	Grao en Estudos de Arquitectura			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Fourth	Obligatory	6
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Construcións e Estruturas Arquitectónicas, Civís e Aeronáuticas			
Coordinador	Garitaonaindia De Vera, Jose R	E-mail	j.garitaonaindia@udc.es	
Lecturers	Garitaonaindia De Vera, Jose R Muñoz Fontenla, Carlos M.	E-mail	j.garitaonaindia@udc.es c.fontenla@udc.es	
Web				
General description	In this course, the students acquire the ability to design building envelopes systems. They will learn the standards requirements in order to choose the appropriate system (performance). Each system will be analysed in order to know how to prescribe every solution, its repair and maintenance, as well as estimate its cost, always in accordance with the architectural project.			

Study programme competences / results	
Code	Study programme competences / results
A14	Ability to conceive, calculate, design, integrate in buildings and urban units and execute exterior walls and cladding, roofing and other structural work (T)
A17	Ability to apply technical and construction standards and regulations
A19	Ability to maintain the finished work
A20	Ability to assess the construction works
A21	Ability to maintain the structural work
A25	Adequate knowledge of conventional construction systems and pathology
A26	Adequate knowledge of the physical and chemical characteristics, production procedures, pathology and use of building materials
A27	Adequate knowledge of industrialized building systems
A31	Knowledge of methods of measurement, assessment and expert´s report
A32	Knowledge of the project of health and safety at the construction site
A63	Development, presentation and public review before a university jury of an original academic work individually elaborated and linked to any of the subjects previously studied
B1	Students have demonstrated knowledge and understanding in a field of study that is based on the general secondary education, and is usually at a level which, although it is supported by advanced textbooks, includes some aspects that imply knowledge of the forefront of their field of study
B2	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
B3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgements that include reflection on relevant social, scientific or ethical issues
B4	Students can communicate information, ideas, problems and solutions to both specialist and non-specialist public
B5	Students have developed those learning skills necessary to undertake further studies with a high level of autonomy
B6	Knowing the history and theories of architecture and the arts, technologies and human sciences related to architecture
B7	Knowing the role of the fine arts as a factor that influences the quality of architectural design
B9	Understanding the problems of the structural design, construction and engineering associated with building design and technical solutions
B10	Knowing the physical problems, various technologies and function of buildings so as to provide them with internal conditions of comfort and protection against the climate factors in the context of sustainable development

B11	"Knowing the industries, organizations, regulations and procedures involved in translating design concepts into buildings and integrating plans into planning "
B12	Understanding the relationship between people and buildings and between these and their environment, and the need to relate buildings and the spaces between them according to the needs and human scale
C1	Adequate oral and written expression in the official languages.
C3	Using ICT in working contexts and lifelong learning.
C4	Exercising an open, educated, critical, committed, democratic and caring citizenship, being able to analyse facts, diagnose problems, formulate and implement solutions based on knowledge and solutions for the common good
C5	Understanding the importance of entrepreneurial culture and the useful means for enterprising people.
C6	Critically evaluate the knowledge, technology and information available to solve the problems they must face
C7	Assuming as professionals and citizens the importance of learning throughout life
C8	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.

Learning outcomes			
Learning outcomes	Study programme competences / results		
The student must acquire the ability to design the different building envelopes systems (vertical and horizontal) and know the standards requirements in order to choose the appropriate system (performance). The student must know how to prescribe every solution, its repair and maintenance, as well as estimate its cost, always in accordance with the architectural project.	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63	B1 B2 B3 B4 B5 B6 B7 B9 B10 B11 B12	C1 C3 C4 C5 C6 C7 C8

Contents	
Topic	Sub-topic
01 ENVELOPES SYSTEMS IN ARCHITECTURE	Lesson 01. Basic concepts: The first shelters and construction. From construction to architecture. Materials. The absence of envelope. Relationship between structure and envelopes. The edge. Walls. Openings. Glass wall.

02 BUILDING-CODE REQUIREMENTES	Lesson 02. Requirements: Roof requirements. Flat roof requirements. Facade requirements. Requirements of underground or basement walls and floors. Efficiency and rationality. Green building rating system (concepts). Lesson 03. Thermal requirements: Basic concepts. Heat transmission. Thermal inertia. New thermal concepts. Phase-change materials. Thermal insulation. Materials. Hygrometric characteristics. Water in construction. Air-conditioning. Thermal bridges. Analysis of several building envelope systems. Finishes. The Spanish Technical Building Code (CTE) DB-HE. Lesson 04. Acoustic requirements: Basic concepts. Sound Insulation vs. Sound Absorption. CTE DB-HR.

03 BUILDING ENVELOPES SYSTEMS	Lesson 05. Roofs and flat roofs: Basic concepts. The functions of a roof. Roof systems. Components. Lesson 06. Underground or basement walls and floors: Basic concepts. Soil moisture. Ventilation. Waterproofing. Drain. Types of basement walls and floors. CTE DB-HS. Maintenance. Lesson 07. Facades: Basic concepts. History. Facade systems. Openings. Lesson 08. Energetic certification: Basic concepts. History. Energy performance certificates (EPCs). Calculation of thermal transmittance, condensation and thermal bridges.
04 CONSTRUCTION DOCUMENTS	Lesson 09. Construction Documents: The Spanish Technical Building Code requirements. Documents.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63 B1 B4 B5 B6 B9 B10 B11 C1 C3 C4 C5 C6 C7 C8	30	8	38
Objective test	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63 B1 B2 B3 B4 B5 B9 B10 B11 B12 C1 C4 C5 C6 C7 C8	2	8	10
Multiple-choice questions	A25 A26 A27 A31 A32 C1 C3	1	0	1

Workshop	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63 B1 B2 B3 B4 B5 B6 B7 B9 B10 B11 B12 C1 C3 C4 C5 C6 C7 C8	30	60	90
Supervised projects	A14 A25 A26 A27 A31 A32 B1 B4 B5 B9 B10 C5 C6 C7 C8	2	6	8
Events academic / information	A25 A26 B3 B11 C6 C7 C8	2	0	2
Personalized attention		1	0	1
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Guest lecture / keynote speech	Lectures aim to provide to the student the knowledge of several ENVELOPES SYSTEMS IN ARCHITECTURE. The standards requirements in order to choose the appropriate system (performance) will be explained, and each system will be analysed in order to know how to prescribe every solution, its repair and maintenance, as well as estimate its cost, always in accordance with the architectural project. Reference documentation and several examples of buildings will be provided to learn from the mistakes and the decisions took. An intelligent knowledge is sought instead of rote learning. The student must pass an objective test and several multiple-choice questions.
Objective test	The objective tests seek to verify the application of knowledge and the skills acquired by students. Students may use documentary support (books, own notes based on a practical case, etc.). It will be assessed as a whole, not each question.
Multiple-choice questions	Students must complete four mandatory testing about different topics in order to promote learning and continuous assessment. These tests are carried out within the learning platform UDC Moodle.

Workshop	The Workshop methodology includes the two modalities proposed in the study plan: the ARCHITECTURE WORKSHOP and the SUBJECT WORKSHOP. The ARCHITECTURE WORKSHOP is a workspace where several subjects join around a project of architecture. The students develop an architectural project, agreed by the subjects that join the workshop, with the support and supervision of the workshop teachers. The content to develop, relative to the construction subject, is specified in the documentation that is delivered to the students at the beginning of the course. The SUBJECT WORKSHOP is a modality where the students develop a task, usually an architectural project (in parallel to the specific work of the architecture workshop), with the support and supervision of the teachers of the subject. The tasks of both workshops are based on the realization of practices/projects, in which the students apply the skills learnt during lectures. They learn the relationship between the compositional processes of architecture and its construction. The practices are developed and corrected during the interactive sessions (practical classes of the subject and workshop). During the interactive sessions, exercises from previous years are also presented, explaining and detailing the content of each part, serving as support for the workshop classes. The assess of the tasks of the architecture workshop and the workshop of the subject will be weighted according to the requirements of each one of the works. Weighting will be specified, at the beginning of the semester, in a document that will be delivered to the students. Mandatory partial deliveries may be raised. The works will be uploaded to the Moodle platform and also printed when a teacher requests it.
Supervised projects	The students (in group, up to three students, or individually), voluntarily, may participate in the competitions that the teachers suggest. They will obtain a point that will be added to the qualification of the objective test ?theory exam?, as long as they get the minimum mark. The members of the winning team will get 2 points. IMPORTANT: In order to obtain these points, the students will have to submit the minimum documentation required in the competition rules and have been supervised by one of the teachers of the subject. Note. The hours assigned to supervised projects, indicated in the planning of the subject, may be compensated with those assigned to the workshop.
Events academic / information	Activities carried out by the students that imply attendance and/or participation in academic, scientific and/or informative events (congresses, conferences, symposiums, courses, seminars, conferences, exhibitions, etc.) with the aim of deepening their knowledge of topics of study related to the subject.

Personalized attention	
Methodologies	**Description**
Workshop Supervised projects	Besides regular supervision during the workshop and case studies (the projects will be developed in open sessions in the presence of all students), professors offer weekly office hours, and they will encourage students to use them for solving doubts and questions.

Assessment

Methodologies	Competencies / Results	Description	Qualification
Events academic / information	A25 A26 B3 B11 C6 C7 C8	Unless there is a good reason, in order to pass the subject at any of the opportunities, attendance at these events is required.	0
Guest lecture / keynote speech	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63 B1 B4 B5 B6 B9 B10 B11 C1 C3 C4 C5 C6 C7 C8	In order to pass the subject (first and second opportunities), attendance required is at least 80%. Students with recognition of part-time dedication and academic waiver of attendance exemption: 50%. When attendance is completed, it will be preserved in subsequent opportunities. Students must pass an objective test and several multiple-choice questions tests.	0

Workshop	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63 B1 B2 B3 B4 B5 B6 B7 B9 B10 B11 B12 C1 C3 C4 C5 C6 C7 C8	Attendance required: 80%. Students with recognition of part-time dedication and academic waiver of attendance exemption: 50%. The works will be uploaded to the Moodle platform and also printed when a teacher requests it. Partial deliveries can be required. In that case, they are mandatory in order to the final work be graded. The assessment for compulsory projects is not only restricted to content; the authorship must be proved (see comments). There will be no compensation between this assessment and other marks of the subject. In this section, all the tasks related to the architectural workshop and subject workshop will be assessed and pondered in proportion to their complexity. As previously indicated, the weighting applied in the evaluation of each work will be indicated, at the beginning of the course, in a document that will be delivered to the students. The tasks will be valued out of 10 and will be averaged -when students get at least a 5 score (out of 10) in each work-, in the stipulated percentage, with the average mark of the objective test + Multiple-choice questions. Students will not pass the task if they made serious mistakes such: non-compliance with technical codes; acoustical bridges; finishes: absence of expansion joints; stairs: wrong dimensions; contact between incompatible materials. In order to pass, first year students must deliver every part of the architectural workshop. If not, they will obtain a "NO PRESENTADO" (absent from assessment). According to the documentation from ETSAC degree in Architectural Studies memory, a Board of Assessment will be convened to analyze the results and resolve, if appropriate, specific cases of student assessment. Students who fail the workshop at the first opportunity will have a second chance to pass. If they obtain a "NO PRESENTADO" (absent from assessment), they cannot attend the second opportunity. Students who fail the specific part of the subject must develop in consecutive opportunities, with the appropriate adjustments, the project failed. This will happen in all opportunities and calls.	70

Multiple-choice questions	A25 A26 A27 A31 A32 C1 C3	Students must complete four mandatory testing about different topics. They must get at least a 5 score (out of 10) in each test (including penalizations). Three attempts in each are allowed with cumulative penalty of two points (first attempt: 0 points penalty, second attempt: 2 points, third attempt: 4 points). When students get at least a 5 score (out of 10), mark will be preserved until July (included) (for each test independently). These tests are carried out within the learning platform UDC Moodle.	15
Objective test	A14 A17 A19 A20 A21 A25 A26 A27 A31 A32 A63 B1 B2 B3 B4 B5 B9 B10 B11 B12 C1 C4 C5 C6 C7 C8	The objective tests seek to verify the application of knowledge and the skills acquired by students. Students may use documentary support (laptops, books and/or own notes). In order to pass the objective test, students may get at least a 4 score (out of 10). Mark will be preserved until the second opportunity (included). Students will not pass the objective test if they made serious errors such: non-compliance with technical codes; absence of waterproof barriers or insulating elements; acoustic bridges; wrong description of glazing and carpentry; thermal bridges or condensations.	15
Supervised projects	A14 A25 A26 A27 A31 A32 B1 B4 B5 B9 B10 C5 C6 C7 C8	The student can get up to 2 points (see Methodologies) that will be added to the mark obtained in the objective test.	0

Assessment comments
In order to promote continuous assessment, attendance will be controlled and the final mark will depend on the attitude and the work of the student. Students must pass theoretical and practical tests (Objective test, Multiple-choice questions tests) and the workshop. This will confirm if the student assimilated the concepts, the competences, and methods of work of the subject. SIMULTANEOUS CONDITIONS TO PASS THE SUBJECT IN ALL OPPORTUNITIES: Complete the required assistance.Workshop: at least 5 points (out of 10), each work.Objective test: at least a score of 4 (out of 10).Multiple choice questions: at least a score of 5 (out of 10), each test.OVERALL AVERAGE MARK: Average between the mark of the objective test (plus the supervised projects) with the average of the multiple choice questions. This mark makes average with the workshop work/s. If the above conditions are not got, the same formula will be applied but the maximum rating will be restricted to 4,9 out of 10,0. The plagiarism or the fraudulent performance of objective tests or any other evaluation activities, once verified, will directly imply a failure grade "0" in the subject at the corresponding opportunity. Students who failed at the first opportunity will have a second chance to pass. If they obtain a "NO PRESENTADO" (absent from assessment), they cannot attend the second opportunity. If students do not get the minimum attendance or do not deliver every part of the subject (Objective test, Multiple-choice questions tests, Supervised projects and Workshop), then they will obtain a "NO PRESENTADO" (absent from assessment) (in each opportunity). Students with partial validations or exchange programs will have a set treatment for each case. The program of the subject, delivered at the beginning of the course, will include information about work/s, minimum contents, delivery dates, dates of multiple choice tests, etc.

Sources of information	
Basic	Sources of information can be found at the beginning of each lesson (PDF archive).Sources of information can be found at the beginning of each lesson (PDF archive).

Complementary	Complementary sources of information can be found at the beginning of each lesson (PDF archive).Complementary sources of information can be found at the beginning of each lesson (PDF archive).

Recommendations
Subjects that it is recommended to have taken before
Construction 4/630G02027 Architectural Design 5/630G02021 Structures 3/630G02028 Urbanism 3/630G02029
Subjects that are recommended to be taken simultaneously
Urbanism 4/630G02032 Structures 4/630G02034 Architectural Design 6/630G02026
Subjects that continue the syllabus
Construction 6/630G02037
Other comments
According to the documentation from ETSAC degree in Architectural Studies: "Students must study simultaneously all the subjects within the workshop if it is the first time they sign up"... "Students must study (previously or simultaneously) all subjects related to previous workshops not completely passed".---The gender perspective is incorporated into this subject, in accordance with the applicable regulations for university teaching.Work will be done to identify and modify prejudices, sexist attitudes and situations of discrimination based on gender. Actions and measures will be proposed to correct them, and values of respect and equality will be promoted.---IMPORTANT: This Teaching Guide is written in Galician, Spanish and English. These language versions are considered to be equally authentic. In the event of any discrepancy between the three aforementioned versions, the Spanish version shall prevail in determining the spirit, intent, and meaning of this Guide.