UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2019/20
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	Antelo Tudela, Enrique Carreira Montes, José Ángel Garitaonaindia De Vera, Jose R Redondo Porto, Alberto		E-mail	enrique.antelo@udc.es j.cmontes@udc.es j.garitaonaindia@udc.es a.redondo@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	
Code	Study programme competences
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		
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	Ordinary class hours	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	1	31
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	54	84
Multiple-choice questions	A25 A26 A27 A31 A32 C1 C3	2	14	16

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	1	7	8
Supervised projects	A14 A25 A26 A27 A31 A32 B1 B4 B5 B9 B10 C5 C6 C7 C8	0	10	10
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.
Workshop	The workshop is a workspace where students develop their architectural projects, applying the skills learnt during lectures. They will learn the relationship between the compositional processes of architecture and its construction. Several subjects merge around the idea of architecture, ensuring optimization of teaching resources and streamlining the student's work. The workshop aims to establish mechanisms for coordination and mainstreaming across studies, avoiding duplication and repetition in the content to facilitate an effective transit between semesters. Different mandatory projects will be developed.
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.
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.
Supervised projects	Methodology designed to promote the autonomous learning, under the supervision of the teacher and in varied scenarios (academic and professional). It is referred primarily to learning how to do things. It is an option based on the assumption by students of the responsibility of their own learning. Supervised work (mandatory): students, in group (up to 3 students) or individually, will present a work where they will develop a topic assigned by the professors. Students will search bibliography, contents, comments, studies and examples. The work will be showed and upload to the learning platform UDC Moodle, in PDF format. Model (voluntary): students, in group (up to 3 students) or individually, will build a model (scale 1:1 or 1:2) based on a construction detail of the building developed in the workshop project.

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**	**Description**	**Qualification**

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, attendance required is at least 75%. (January and July opportunities) When attendance is completed, it will be preserved in subsequent opportunities. Students must pass an objective test, several multiple-choice questions tests (and a supervised project can be required).	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%. 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 restricted to content; the authorship must be proved. There will be no compensation between this evaluation and other qualifications of the subject. Students must get at least a 5 score (out of 10). Absence of waterproof barriers or insulating elements; acoustic bridges; wrong description of glazing and carpentry; thermal bridges or condensations will be considered serious errors that can lead to fail the subject. In order to pass, first year students must deliver every part of the 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 in January will have a second chance in July. If they obtain a "NO PRESENTADO" (absent from assessment), they cannot attend the second opportunity (July). Students who fail the specific part of the subject (Construction 5) (January and July) must develop in consecutive opportunities, with the appropriate adjustments, the project failed. This will happen in all opportunities and calls. Students with partial validations or exchange programs will have a set treatment for each case.	50
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.	25
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 (books and own notes). Students must pass an objective test and several multiple-choice questions tests. The final mark will be the average of them, only if they get at least a 4 score (out of 10) in the objective test. Students will not pass the objective test if they made serious errors such: absence of waterproof barriers or insulating elements; acoustic bridges; wrong description of glazing and carpentry; thermal bridges or condensations.	25

Supervised projects	A14 A25 A26 A27 A31 A32 B1 B4 B5 B9 B10 C5 C6 C7 C8	Supervised work: compulsory to pass the subject (the program file of the subject, delivered at the beginning of the course, will include information about this work). The student can get up to 3 points that will be added to the mark obtained in the objective test. Model: volunteer work (maximum group of three students); model of one of the projects developed in the Workshop (the program file of the subject, delivered at the beginning of the course, will include information about this work). The student can get up to 3 points that will be added to the mark obtained in the objective test.	0

Assessment comments
The program of the subject, delivered at the beginning of the course, will include information about minimum contents, delivery dates, dates of multiple choice tests, lessons, partial deliveries and everything needed to study the subject. 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), the supervised projects andthe 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). - Objective test: at least a score of 5 (out of 10). - Multiple choice questions: at least a score of 5 (out of 10), each test. - Delivery of the supervised work. OVERALL AVERAGE MARK: Average between the mark of the objective test plus the supervised work and the model with the average of the multiple choice questions. This mark makes average with the workshop work. 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. Students who failed in January will be able to pass the subject in the second opportunity (July) but 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, Workshop and Case study), then they will obtain a "NO PRESENTADO" (absent from assessment) (in each opportunity).

Sources of information	
Basic	La especificada en cada tema, ver programación de la asignatura
Complementary	La especificada en cada tema, ver programación de la asignatura

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".IMPORTANT: This Teaching Guide is written in Spanish and in English. Both language versions are considered to be equally authentic. In the event of any discrepancy between the two aforementioned versions, the Spanish version shall prevail in determining the spirit, intent, and meaning of this Guide.