Teaching Guide			
Identifying Data			2020/21
Subject (*)	Zero-Emission Buildings and Efficiency Rehabilitation Strategies	Code	770523008
Study programme	Mestrado Universitario en Eficiencia e Aproveitamento Enerxético		

Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Optional	3

Language	Spanish		
Teaching method	Face-to-face		
Prerequisites			
Department	Construcións e Estruturas Arquitectónicas, Civís e Aeronáuticas		
Coordinador	Raya de Blas, Antonio	E-mail	antonio.raya@udc.es
Lecturers	Pintos Pena, Santiago Raya de Blas, Antonio Redondo Porto, Alberto	E-mail	santiago.pintos.pena@udc.es antonio.raya@udc.es a.redondo@udc.es
Web			
General description	This subject exposes the new European conception of buildings of almost zero emissions from the view of demand and consumption. Different singular strategies are presented in built buildings.		
Contingency plan	1. Modifications to the contents 2. Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students 4. Modifications in the evaluation *Evaluation observations: 5. Modifications to the bibliography or webgraphy		

Study programme competences / results	
Code	Study programme competences / results
A2	Análisis e implantación de medidas de ahorro y eficiencia energética en los sectores industrial, terciario y residencial.
B6	Buscar y seleccionar alternativas considerando las mejores soluciones posibles.
B11	Adquirir nuevos conocimientos y capacidades relacionados con el ámbito profesional del máster.
B18	Plantear y resolver problemas, interpretar un conjunto de datos y analizar los resultados obtenidos; en el ámbito de la eficiencia energética y la sostenibilidad.
C2	Fomentar la sensibilidad hacia temas medioambientales.
C5	Adquirir la capacidad para elaborar un trabajo multidisciplinar

Learning outcomes	
Learning outcomes	Study programme competences / results

The student must know the energy demands of architectural spaces, the applicable regulations and propose solutions. You must know how to prescribe the solution, repair and maintenance according to the architectural project.	AJ2	BC6 BC11 BC18	CC2 CC5
The student must know the energy consumption of architectural spaces, the applicable regulations and propose solutions. You must know how to prescribe the solution, repair and maintenance according to the architectural project.	AJ2	BC6 BC11 BC18	CC2 CC5

Contents	
Topic	**Sub-topic**
1. INTRODUCTION	Historical framework energy-housing. Regulatory framework Basic concepts Real estate context Ecological footprint Environmental and energy certifications
2.- CLIMATE	Climate and construction The environment and the building Hygrothermal comfort Climogram
3.- PASSIVHAUS	Zero demand: passive and bioclimatic design Design criteria of the passive architecture
4.- ENERGY EVALUATION IN BUILDING	Regulatory framework Thermal envelope evaluation: losses and gains Valuation and optimization; computer tools for calculation Applied software BIM solutions Practices
5.- ENERGY CERTIFICATION IN BUILDING	Regulatory framework Energetic certification Applied software BIM solutions Practices
6.- REHABILITATION OF ZERO DEMAND	Strategies Building solutions and architectural examples in different climates Practices
7.- REHABILITATION OF ZERO CONSUMPTION	Strategies Building solutions and architectural examples in different climates Practices

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A2 B6 B11 B18 C2	10	10	20
Case study	B6 B11 B18 C2 C5	6	16	22
Workshop	A2 B6 B11 B18 C2 C5	8	24	32
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	Exhibition sessions where knowledge related to zero-emission buildings is taught: historical framing, climate, typologies, materials, regulations, conception, design, safety, assessment, prescription, conservation, injuries and repair. All this based on the demands demanded and in accordance with the architectural project Providing a reference documentation that allows the student to be provided with bibliographic resources with which it is handled with comfort, it is not sought a memorístico knowledge of the contents, but an intelligent knowledge of the matter. Knowledge in which the teaching of the injury and mistakes made in different works plays a fundamental aspect, especially when it is possible to accompany them with images that, due to their didactic value, allow the student to appreciate the transcendence of the decisions made. It is assessed through an objective test and several multiple answers
Case study	In the development of the classes buildings of zero emissions of contrasted architectural quality will be exhibited in which the materialization of the architectural ideas is appreciated, their technical and documentary development, serving as a model for the development of the workshop work. It will be evaluated within the Workshop
Workshop	The Workshop is a space of work and exchange designed to facilitate the confluence of the contents of the different subjects around architecture, guaranteeing the optimization of teaching resources and rationalizing student work. The Workshop aims to establish mechanisms of coordination and transversality throughout the studies, avoiding duplication and repetition in the contents, facilitating the efficient transit of the student between successive semesters, alleviating the negative impact that the dispersion of subjects studied in different semesters by large part of the students has in the required efficiency of the teaching system. The Workshop is proposed as a tool for the development and evaluation of the competences related to the architectural creation The realization of practices, as the basis of teaching, in which the student finds an immediate identification between the compositional ideas and its constructive materialization applying the theoretical knowledge of the master classes. Planning the constructive development of significant architectures, by the student, with the support and explanatory development of the processes in the interactive classes Compulsory partial deliveries will be made

Personalized attention	
Methodologies	**Description**
Workshop	The student must consult the doubts that arise to ensure a better development of the work to be presented as a result of the Workshop

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Case study	B6 B11 B18 C2 C5	In the development of the classes will be exhibited works of contrasted architectural quality in which the materialization of architectural ideas is appreciated, its technical and documentary development, serving as a model for the development of the workshop work. They will be developed constructively by the student and their evaluation is done as a section of the Workshop	0

Workshop	A2 B6 B11 B18 C2 C5	80% attendance of interactive sessions is required The evaluation of the obligatory practice of the workshop is not restricted to the contents, also, the authorship of the same is verified There will be no compensation between this evaluation and other qualifications of the subject The delivery of the case studies will be taken into account in the evaluation of this part It will be valued on 10 and will average with the qualification obtained as evaluation of the master classes whenever a 5.0 or more is obtained. For students who are attending the WORKSHOP for the first time, it will be an essential condition to have delivered all the parts of the subjects that comprise it. If this condition is not met, the qualification "NOT PRESENTED" will be obtained. In accordance with what is established in the memory of the Degree of Architect, a Workshop Evaluation Board will be convened, which will analyze the overall results of the same and decide, where appropriate, on specific cases of student assessment. If you do not pass the Workshop, you can recover at the next opportunity. The rating of NOT PRESENTED is not recoverable The students that do not exceed the part of this subject of CONSTRUCTION 3 integrated in the WORKSHOP 5 will have to present, in consecutive calls, again and with the opportune corrections, the works proposed in the workshop in which they participated until they were over This will apply in all opportunities and calls Students who have partial validation or come from exchange programs will have a treatment adjusted to each cas	80
Guest lecture / keynote speech	A2 B6 B11 B18 C2	Attendance at the lectures is required at least 75% in order to be able to pass the subject (both on the first and on the second opportunity). Once the assistance is completed, it is preserved in subsequent calls The evaluation will be carried out by means of the objective test and the one of multiple answers, that determine an average as long as in the objective test one obtains, at least, 4.0 on 10,0 It is evaluated in the face-to-face and multiple-choice tests	20

Assessment comments
After overcoming the required face-to-face, the student will present a reprint of his TFM that will have the following sections: 1.-Index, suitably paged 2.-Introduction or general approach. It raises the field of study, the causes and the objectives that are intended to be achieved. In this case it is intended to deepen the learning results of this subject: Integration, Coordination and Problematic of Facilities in Rehabilitation 3.-State of the question. Critical summary of the most significant referenced documents and their study methodology. In the case of building analysis, you must provide examples and methodologies that support the proposal for the building in question. 4.-Develop it. Exposed by epigraphs the ideas of the work and its data will be argued. The theoretical-academic foundations that underlie the work must appear. 5.- Conclusions, coherent with the objectives set out in section two 6.-Bibliography. A distinction must be made between the bibliography cited and used to carry out the work. If the article has DOI, it must be indicated (especially when referring to a web page) 7.-Annexes. Data tables, general plans, photographs, figures, support graphics or any supplementary material

Sources of information	
Basic	Se aportarán en cada uno de los temas presentados
Complementary	

Recommendations
Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.