Teaching Guide				
Identifying Data				2023/24
Subject (*)	Building Structures III		Code	670G01116
Study programme	Grao en Arquitectura Técnica			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatory	6
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Construcións e Estruturas Arquitectónicas, Civís e AeronáuticasEnxeñaría Civil			
Coordinador	Muñiz Gomez, Santiago	E-mail	santiago.muniz@udc.es	
Lecturers	Lamas Lopez, Valentin Mosquera Rey, Emilio Muñiz Gomez, Santiago	E-mail	valentin.lamas@udc.es emilio.mosquera@udc.es santiago.muniz@udc.es	
Web				
General description	Structures III is a core subject corresponding to the fourth year of the Wool Building Engineering studies. The content of the wool subject is, as stated in the Career Wool Study Plan: Concrete structures, foundations and Geotechnics: design considerations, construction provisions, dimensioning and verification. The knowledge to be acquired is included in: -Features of him Reinforced Concrete -Reinforced Concrete Gates -Reinforced Concrete Slabs -Foundations -Usual constructive solutions -Features of soils -Geotechnics			

Study programme competences / results	
Code	Study programme competences / results
A51	A2.5 Ability to address and resolve construction details.
A56	A3.1 Ability to apply building rules and standards, and draw up technical specifications in relation to building methods and procedures.
A58	A3.3 Ability to carry out initial sizing, design, calculation and testing of structures, and oversee their implementation.
B31	B1 Students will demonstrate knowledge and understanding of subjects that build upon the foundation of a general secondary education using advanced textbooks and ideas and analyses from the cutting edge of their field.
B32	B2 Students will be able to use their knowledge professionally and will possess the skills required to formulate and defend arguments and solve problems within their area of study.
B33	B3 Students will have the ability to gather and interpret relevant data (especially within their field of study) in order to make decisions and reflect on social, scientific and ethical matters.
B34	B4 Students will be able to communicate information, ideas, problems and solutions to specialist and non-specialist audiences alike.
B35	B5 Students will develop the learning skills and autonomy they need to continue their studies at postgraduate level.
C1	Adequate oral and written expression in the official languages.
C3	Using ICT in working contexts and lifelong learning.
C4	Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective.
C5	Understanding the importance of entrepreneurial culture and the useful means for enterprising people.
C6	Acquiring skills for healthy lifestyles, and healthy habits and routines.
C7	Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development.

C8	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.
C9	Ability to manage times and resources: developing plans, prioritizing activities, identifying critical points, establishing goals and accomplishing them.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Upon successful completion of this subject, students will have knowledge applied to Technical Architecture of the principles of typologies, calculation bases, dimensioning and verification of reinforced concrete structures. They will obtain a general and unified vision of what the mechanical foundations of reinforced concrete structures and their execution and control in the field of construction.	A51 A56 A58	B31 B32 B33 B34 B35	C1 C3 C4 C5 C6 C7 C8 C9

Contents	
Topic	Sub-topic
1.- INTRODUCTION TO REINFORCED CONCRETE STRUCTURES 2.- BASES OF CALCULATION 3.- MATERIALS. TYPES 4.- DEFORMATION DOMAINS 5.- CALCULATION OF SECTIONS 6.- STRUCTURES PROJECT BY H. A. 7.- COMPUTER METHODS OF CALCULATION IN H.A. 8. UNIDIRECTIONAL FLOORS 9. BIDIRETIONAL FLOORS AND SLABS 10.- REGIONS "D" 11.- DEFORMATIONS IN H. A.	

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A8 A51 A56 A58 B31 B32 B33 B34 B35 C1 C3 C4 C5 C6 C7 C8 C9	30	30	60
Problem solving	A8 A51 A56 A58 B31 B32 B33 B34 B35 C1 C3 C4 C5 C6 C7 C8 C9	30	55	85
Mixed objective/subjective test	A8 A51 A56 A58 B31 B32 B33 B34 B35 C1 C3 C4 C5 C6 C7 C8 C9	4	0	4
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	2600 / 5000 Resultados de traducción They constitute an important part of the student's face-to-face activity and are developed through a mainly expository method, trying, however, to involve the student, insofar as this is possible, in the development stage of the exposed topic, providing them with the opportunity to ask questions and express ideas, thus leading, by indirect influence, to the learning process. The exhibition is carried out with the support of audiovisual and computer media and is structured in the following stages: introduction, development, summary and bibliographic orientation. They are taught for the entire group. Following the guidelines of the Center's Head of Studies, the lectures have a real duration of 1h50m, with an intermediate break of around half the class and 10 minutes of courtesy between class and class. Punctuality is requested. The teacher can establish time limits to this punctuality (in this guide there is some reference to this situation) depending on the development of the course in order to have access to the classroom. The attendance control can be carried out by the teacher at the time that he considers appropriate during the class. There may be several attendance checks during the class. It is recalled that such assistance is active and not only in person. Attendance must be complete and not partial (sign and leave). It is intended to state that not all the syllabus of the subject has to be developed by direct presentation of it by the teaching staff. The exhibition will focus on those aspects that are considered more important or complex to acquire independently by the student. Thus, various sections of the syllabus must be prepared by the student himself. Controls are established that allow both student self-evaluation and teacher supervision of the knowledge acquired. For this development, the student is provided with reference teaching material, as well as recommended and specific bibliography, normally based on the means that the EUAT offers in its library. During the development of the course there may be various controls and questionnaires under ICT platforms, in order to include student self-assessment criteria, which allows them to know their degree of assimilation of content in order to take the appropriate teaching measures. In the case of activating these activities, they are communicated in a timely manner during the course. There are also rubric-type documents that allow students to monitor their acquisition of knowledge.

Problem solving	These classes are taught for the subgroups of the subject and their development is in accordance with the specific programming at each moment. In this way its contents can be: -Practical resolution of problems related to the subject. This resolution can be carried out by the teacher, by the students or in a mixed way. -Theoretical-practical work. On the basis of bibliographic references, the development of parts of the subject is deepened. -Follow-up of subject practices. These activities are designed for students who attend the course continuously from the beginning of the course, and are a fundamental basis for acquiring knowledge about it. In the first days, possible subgroups and practical topics to be developed are established, being part of the base of these common topics for the entire course, so it is essential to comply with the assistance in this specific period. The duration of these classes is 1.50 hours without intermediate break. The teacher can prevent access to the classroom or not collect a certain practical activity for a student who intends to enter the classroom with an excessive delay, damaging the collaborative work in the classroom. In any case, arrival at an interactive class with a delay of more than half an hour is considered NOT TO BE CARRIED OUT. This is extendable to the delivery of said activity, unless authorized by the teacher. Three types of practical activities are initially established. -Class practices: Developed during classes for subgroups, being delivered, where appropriate, during the same class or the next, as deemed appropriate at all times. They can be of purely practical content or contain theoretical development. Although they are individual, their resolution is done collaboratively and assisted by the teacher. It is intended that they are linked to the course practice. -Possibility of special class practices: Depending on the teaching needs of the course, specific practices can be established as a summary of parts of the subject, carried out individually by the student and delivered during said class. The adoption of this model would be specifically indicated during the first weeks of the course based on the previous diagnosis of knowledge that is had at a given moment. -Course practice: It is developed throughout the course as autonomous work of the student, although follow-up controls will be carried out with partial deliveries throughout the semester. It tries to confront the student with a real structure, beyond a mere partial analysis, thus specifying the knowledge acquired to the problems of the usual building. The various deliveries are tailored to the actual progress of the course. The development of this course practice is individual or in a small group, as established at the beginning of the course. Part of the class practices will deal with specific problems of this course practice. In the Moddle platform of the subject, the specific conditions for this type of practice and its characteristics will be made explicit.
Mixed objective/subjective test	Mandatory final exam for all students, in order to demonstrate the ability acquired in the various subjects.

Personalized attention	
Methodologies	**Description**
Mixed objective/subjective test Guest lecture / keynote speech	Their purpose is to answer the questions of students about the various aspects of the subject, focused on theoretical aspects of it or solving specific problems. They are usually individual, although, if the course development conditions advise it, they can be for very small groups. The tutoring is not intended as a substitute for the follow-up and control activities of the course practices, but rather to resolve doubts, normally linked to the development of the subject. Each teacher's tutoring schedule is duly announced on the appropriate notice board and even on the School's website. Even so, it is highly recommended to request an appointment in person or by email, in order to optimize times and avoid waiting.

Assessment

Methodologies	Competencies / Results	Description	Qualification
Mixed objective/subjective test	A8 A51 A56 A58 B31 B32 B33 B34 B35 C1 C3 C4 C5 C6 C7 C8 C9	In 1st and 2nd opportunity according to the official calendar.	30
Problem solving	A8 A51 A56 A58 B31 B32 B33 B34 B35 C1 C3 C4 C5 C6 C7 C8 C9	-Course practice: It is delivered at the end of the semester on the date that will be indicated at the beginning of the course, with partial deliveries that will be indicated according to the specific planning of the course. There is a single delivery for 1st opportunity, not allowing deliveries or improvements for 2nd opportunity. (fifty%) -Weekly internships: Normally delivered during their completion date, although there may occasionally be postponed deliveries. Subsequent deliveries or improvements are not allowed at all times. (twenty%)	70

Assessment comments
Regardless of the previous grade, each of the indicated items must be graded with at least 30% of its maximum theoretical grade. This percentage can be modified depending on the specific characteristics of the course. The criteria for student participation and attendance at the course activities indicated above must also be met.All attendance controls, questionnaires, practices and, in general, the course activities indicated above will only be computed for those students duly enrolled and who appear on the official lists at the time they are carried out. In other words, the possibility, for example, of a student attending the course as a "listener" is not contemplated while their enrollment is not "official": all the activities and qualifications obtained before they appear in the official lists will not be taken into account. (Teachers will not manually expand any type of student list, only official lists will be used).Early call:For this specific case, the aforementioned evaluation criteria are varied:-Calculation of course and weekly practice only of the immediately previous course: 40%-Extraordinary exam early call: 60%For this call, no extension of the practical activities indicated above is allowed. Only the practical qualifications of the immediately previous course are recovered. In the event that the student had not developed these practical activities, the maximum mark of said exam would be 60% of the total. In this exam, a 5 out of a maximum score of 10 is considered as an Approved grade.This criterion is maintained for students who do not deliver some of the practical activities (weekly practices or course practices): Exam over 60% of the maximum grade.If the particular situations of development of the course so advise, the above percentages and criteria may be adjusted. If this happens, it will be announced in a timely manner and published on the subject's Moodle platform.Students with recognition of part-time dedication and academic attendance waiver: Qualification conditions are maintained with the exception of the need for 80% attendance. Yes, the partial and final deliveries are maintained, as well as a follow-up that allows verifying the authorship of this material.

Sources of information

Basic	INTRODUCCIÓN A LAS ESTRUCTURASGORDON, J.E.Estructuras o por qué las cosas no se caen.Celeste, 1.999 MALCOM MILLAISEstructuras de edificaciónCeleste Ediciones, Madrid 1.997REGALADO TESORO, F.Breve introducción a las estructuras y a sus mecanismos resistentesCype Ingenieros, Alicante, 1.999SALVADORI, M. / HELLER, R.Estructuras para arquitectos.Editorial CP67, Buenos Aires, 1.987TORROJA, E.Razón y ser de los tipos estructurales.Consejo Superior de Investigaciones Científicas I.E.T.c.c., Madrid 1.991ESTRUCTURAS DE HORMIGÓN SABIN, DOMINGUEZ, LAMAS Y ARAGONCálculo y representación de forjados unidireccionales, reticulares y placas.Univ. La Coruña, 2011 DOMINGUEZ, ARAGON, SABIN, LAMAS, Cálculo y representación de pórticos de hormigón.Univ. La Coruña, 2011 CALAVERA RUIZ, J.Proyecto y cálculo de estructuras de hormigón: en masa, armado y pretensado.Intemac, Madrid, 2008 CALAVERA RUIZ, J.Cálculo, construcción, patología y rehabilitación de forjados de edificación unidireccionales y sin vigas. hormigón metálicos y mixtos.Intemac, Madrid 2002 COMISIÓN PERMANENTE DEL HORMIGÓNGuía de aplicación de la Instrucción de Hormigón Estructural. EdificaciónMinisterio de Fomento, Madrid, 2002 FERRERAS, R.Manual de hormigón armado conforme con la instrucción EHE (1999)CICCP, Madrid 2003 GARCÍA DUTARICálculo de flechas en estructuras de hormigón armado : forjados, losas, vigas de canto, vigas planasIntemac, Madrid, 2009 GARCÍA MESEGUER, AEstructuras de hormigón armadoEscuela de la Edificación. Madrid 1997 JIMENEZ MONTOYA, P, GARCÍA MESEGUER, MORÁN CABRÉ, ARROYO PORTEROHormigón Armado. Ed 15GG. Barcelona 2009 JIMENEZ MONTOYA, P, GARCÍA MESEGUER, MORÁN CABRÉ, ARROYO PORTEROHormigón Armado. Jiménez Montoya Esencial Ed 16CINTER. Madrid 2018 LOPEZ R. MUÑIZConstrucción y cálculo en Hormigón ArmadoCOAAT, Madrid, 1999 MUÑIZ GÓMEZ, S.Estructuras III Vol 1. Hormigón ArmadoEUAT 2014. La Coruña REGALADO, F., et. Alt.Biblioteca de detalles constructivosCype Ingenieros. Madrid REGALADO, FLos forjados reticulares: diseño, análisis, construcción y patología. CYPE Ingenieros. 2003. PÉREZ VALCÁRCEL, JBEstructuras arquitectónicas de hormigón armadoVarios volúmenes. (pórticos, forjados, placas?)Unv. La Coruña, 2011 SOFTWARE CORRES PEIRETTI, H.Prontuario informático del hormigón estructural 3.0Ieca, Madrid 2001 CYPECADCype Ingenieros SECHORDept. Tecnología de la construcciónUniversidad de La Coruña
Complementary	Ver página web de la asignatura y plataforma Moddle

Recommendations
Subjects that it is recommended to have taken before
Structures I [In extinction]/670G01019 Mechanical Basics of Building Structures/670G01104
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
See the subject's website and Moodle platform

(*)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.