



Teaching Guide

Teaching Guide				
Identifying Data			2020/21	
Subject (*)	Construction III		Code	670G01017
Study programme	Grao en Arquitectura Técnica			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatory	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Construcións e Estruturas Arquitectónicas, Cívís e Aeronáuticas			
Coordinador	Caridad Yañez, Francisco Jose	E-mail	francisco.caridad@udc.es	
Lecturers	Caridad Yañez, Francisco Jose	E-mail	francisco.caridad@udc.es	
Web				
General description	CONTENIDOS: La asignatura (materia) Construcción III consta de la siguiente unidad docente: Construcción Hormigón Estructural. Estos contenidos se desarrollan en el programa correspondiente que forma parte de este documento. OBJETIVOS DE LA ASIGNATURA: El conocimiento de las bases teóricas, tecnología y normativa de los oficios indicados en los contenidos, así como la aplicación práctica de dichos conocimientos, que el alumno debe de ser capaz de dominar y demostrar la capacidad de expresar correctamente soluciones a problemas de construcción estructural. Desarrollar el espíritu crítico y de análisis para desarrollar ordenadamente cualquier problema constructivo relacionado con el programa de la asignatura. Conocer y usar la terminología constructiva y poder expresar con rigor y precisión cualquier redacción técnica, facilitando así la correcta comprensión y transmisión de las ideas. Desarrollar la capacidad de representar, de una forma ágil, por medio de croquis o dibujos claros (en sistema diédrico y acotados), ordenados y correctos, las distintas soluciones constructivas, con las especificaciones técnicas necesarias, entendiendo que es el medio de expresión más riguroso y preciso en el campo de conocimiento de la materia. NIVEL DE DIFICULTAD: Se trata de una asignatura de amplios contenidos. La amplitud de la materia y la continua referencia a normas de obligado cumplimiento, obligan al alumno a prestar una atención minuciosa tanto en las clases expositivas como interactivas, así como a la bibliografía facilitada. Del mismo modo los trabajos y prácticas de curso deben expresar, con rigor conceptual y gráfico, las soluciones adoptadas. Se exige, en suma, reflexionar mucho más que realizar un mero ejercicio de memoria, aunque este sea necesario. La mayor dificultad de la asignatura no está en aprender los conceptos generales que se asimilan fácilmente (lo cual resulta sumamente engañoso) sino dedicarle, intensamente, el tiempo programado necesario para interpretar correctamente todos los temas tratados y saber expresarlo posteriormente con precisión y rigor.			



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	
Code	Study programme competences
A4	Coñecer as técnicas e procesos de restauración, rehabilitación, acondicionamento, patoloxía, mantemento e conservación dos edificios en xeral e en particular aqueles específicos do patrimonio cultural constituído pola arquitectura popular e histórica galega.
A22	Administrar e xestionar a adquisición dos materiais, sistemas e recursos propios do proceso construtivo.
A24	Planificar e xestionar a conservación, mantemento, explotación e uso do edificio así como a inspección técnica do mesmo.
B7	Capacidade de traballo en equipo.
B9	Capacidade para traballar nun contexto internacional.
B13	Compromiso ético.
B15	Adaptación a novas situacións.
B21	Motivación pola calidade.
B30	Sensibilidade cara a temas relacionados coa protección, conservación e posta en valor do patrimonio cultural e arquitectónico.
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.

Learning outcomes			
Learning outcomes		Study programme competences	
El alumno será capaz de conocer los materiales, tecnologías, equipos, sistemas y procesos constructivos propios de la edificación en general y en particular aquellos específicos de Galicia.		A4	C1
		B7	C3
		B9	C3
		B13	C4
		B15	C5
		B21	C6
		B30	C7
			C8



El alumno será capaz de administrar y gestionar la adquisición de materiales, sistemas y recursos propios del proceso constructivo.	A22	B7 B9 B13 B15 B21 B30	C1 C3 C4 C5 C6 C7 C8
El alumno será capaz de gestionar la conservación, mantenimiento, explotación y uso del edificio así como la inspección técnica del mismo.	A24	B7 B9 B13 B15 B21 B30	C1 C3 C4 C5 C6 C7 C8

Contents	
Topic	Sub-topic



1.- STRUCTURAL CONCRETE CONSTRUCTION.

COURSE SYLLABUS:

1.1.- Historical background: Brief survey of characteristics and properties of concrete. Actual present knowledge of concrete technology. Regulations. EHE Instruction. Spanish Building Code.

1.2.-Basic knowledge of reinforced concrete: The adhesion between concrete and steel. Continuity and chained monolithic reinforced concrete structures. Protection of rebars. Incompatibilities. Durability.

1.3.-Preparing and Setting-up fresh concrete: Mixing in-situ concrete. Ready-mix concrete. Characteristics. Conditions of complete feeding of the fresh concrete delivered. False full cure. Transporting concrete. Setting-up fresh concrete. Pouring and compacted. Setting-up fresh concrete with pump. Sprayed concrete (gunning). Use of additives. Superfluidifiers, Self-compacting concretes. Curing concrete: Precautions. Concreting in cold weather. Concreting in hot weather. Concreting joints.

1.4.-Steel reinforcement: Steels applying to building construction. Identification of steel bars. Geometrical characteristics, mechanical, adherents, apting for welding

1.5.- Types of steel reinforcement: Diameter. Maximum and minimum distances between bars. Corrosion Protection coatings: distance between parameters. Geometric quantities of the reinforcements. Mandrel diameters, hooks of the negative bending and bending bars.

1.6.-Anchoring of reinforcement Steel bar: Types of anchoring. Fittings: overlap, solder, sleeve. Types of anchoring. Mechanical anchoring . Welding

1.7.-Concrete skeletal: Portal Framed structures. Columns. Beams. Cantilever. Cross bars. Bracings and chained. General concepts. Arrangement of reinforcements depending on their mechanical work and the execution conditions. Parts curved path. Broken parts. Execution conditions.

1.8 - Discontinuity in concrete. Staple Regions. Systems struts and ties. Concentrated loads on solid. Joints: Concepts, utility and generalities. Types of joints. Plastic hinges. Deep beams. Corbel.

1.9 - Surface elements. Slabs and supported / embedded in two or more sides plates. Surface systems supported on pillars plates and waffle slabs. Reinforced concrete basement walls: Load-bearing walls. Retaining walls: Types, design criteria. Diaphragm walls. Conditions of execution.

1.10 - Floors: Concept and tough mission. Types of floors. Specific floors: slabs. Conditions of execution. Applicable regulations.

1.11 -Concrete stairs: Typology. Stringers. Slabs. Structural organization. Conditions of execution.

1.12 - Foundations: General. Polls. Precautions and safety conditions. Different types of concrete foundations. Shallow foundations. Rigid pile caps and footings. Flexible footings. Footings, continuous, and combined. Foundation slabs. Deep Foundations: Piles. Typology. Procedures placing. Pile caps. Diaphragm walls. Shoring and anchors. Conditions of execution.

1.13 - Pathology and therapeutic of structural concrete: pathological aspects. Causes of the main pathologies. Symptoms. Repair of structural damage. Determination of the etiology of injury.

1.14 - Prestressed concrete: Concept of prestressing. Historical data. Materials used and their characteristics. Tensioning Systems. Tensioning devices. Cats and anchors. Pods. Splicing of armatures. Injection and sealing. Current regulations and recommendations. Execution Control of prestressed concrete. Tolerances.



Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	A4 A22 A24	28	35	63
Supervised projects	A4 A22 A24 B7 B9 B13 B15 B21 B30 C8 C7 C6 C5 C4 C3 C1	28	52	80
ICT practicals	C3	0	1	1
Workshop	B7 B9 B13 B15 B21 B30 C1 C3 C4 C5 C6 C7 C8	1	0	1
Objective test	A4 A22 A24 C1 C3	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	LECTURING HOURS: Oral exposition completed with media use and the introduction of some questions addressed to students, with the aim of transmitting knowledge and facilitate the learning process. It will be included the possibility to programming assistance to scientific events and-or informative, taught to any Centre of the UDC campuses with the aim to deepen the understanding of issues related to the subject study. These activities provide students current knowledge and experience incorporating the latest developments relating to any specific field of study. The student must assume that it is not enough to know only what the teacher discussed in class, but you're bound to get, by their means, other complementary knowledge. From 28:00 hours of attendance per student exhibition scheduled for the course material, non-contact hours 54:00 deemed necessary, the student must devote to their preparation and learning. The official schedule will be adjusted to center hours, maintaining a margin of one week to correct any deviations for any reason, unscheduled might occur.
Supervised projects	HOURS AT HOME (ACADEMIC WORKS FOR THE COURSE): It is scheduled two academic works for the whole semester, framed within the academic units that develop programming matter. Work will be done in groups, with a maximum of five students (minimum 3). Each groups will be maintain immovable during the whole work, so abandonment of any member during completion, it will not be an excuse to not deliver the remaining work and to exhibit or to justify lack of quality and preparation. It is fixed a maximum extension of each of them in 10 DIN A4, from whom and in a approximately way will be established 6 of text, 3 of images and 1 of bibliography used, graphic detailing and similar. In a whole, it is fixed an amount of words/work between 1.800 minimum and 2.500 maximum. (Text type of Word 2007, Calibri fond and body-11). The delivery will be over physical support (paper) or in digital support (*.pdf) through of Moodle depending the way that every lecturer demand delivery in each group. The scheduling of deliveries will be made in the possible mismatch with the delivery of the "works" according to the timetable provided equally purpose by the teacher of each group and whose dates will not be postponed. The average non-contact hours per scheduled work are from 6:00 pm.
ICT practicals	IT will be used to perform adequately all proposed activities.



Workshop	SIGNATURE OF 12 ITEMS: It is established the following item groups: 1) and 2) Assistance; 3) and 4) punctuality; 5) and 6) attention; 7) and 8) class notes; 9) observation of the delivery and presentation standards established in jobs and internships; 10) and in the bibliography (690-2010 ISO, with the first element-date quotes footer); last 11) and 12) the ability to work in groups with their manifestations through oral and visual presentation, by its components. It is scheduled for this methodology a total of 0:30 hours maximum approximate attending classes, but in reality its observation will take place throughout the student's classroom programming.
Objective test	THEORETICAL EXAM: Written test used to assess learning process. Mainly, it will be one of the two following ways: 1.- SHORT ANSWER TEST (VIÑETAS-TYPE): Written test to recover learning. It is presented a question to answer, with a definition, classification, brief or similar, and/or required graphic detailing 2.- MULTIPLE ANSWER TEST: Written test to select the correct answer between several options. For this methodology it is scheduled about 1:00 presential hours maximum

Personalized attention

Methodologies	Description
Guest lecture / keynote speech Supervised projects	This activity can unfold in person (directly in the classroom and / or times that the teacher has assigned to tutoring office) or non-contact (through email or virtual campus, through spaces Moodle communication tool). Two distinct and complementary operational are distinguished: 1 -SMALL GROUP TUTORING: its realization is important to consult with the teacher the progress that is being gradually implemented to provide the necessary guidance and in each case to ensure the quality of the work according to the criteria that you specify. Monitoring should preferably collectively according to the teacher being individualized monitoring if deemed necessary in the exposed operational. 2 -PERSONALIZED SERVICE OF TUTORING: Recommended for use by students, with the teacher every booking time to address and resolve the doubts of the students regarding specific aspects of the subject. Generally must be requested in advance for the teacher to organize and establish its realization as it should be, as appropriate in each case. They must also be distributed throughout the course, avoiding concentrations on the eve of exams.

Assessment

Methodologies	Competencies	Description	Qualification
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Objective test	A4 A22 A24 C1 C3	THEORETICAL EXAM: At the first opportunity, throughout the semester four theoretical examinations, that in order to compute the weighted established for the same is scheduled, it should reach half 4 out of a total of 10 points (say 16 points out of a total of 40 points). The completion of these tests is set to YES essential requirement to pass the course. Failure to submit one of them will be an NP (not shown) at the first opportunity. Exceptionally, whenever it deems the affected (being specifically excluded) teacher, the student can adequately justify in writing, as early as possible the existence of any of the 6 events set forth in art. 12 ("Standards of evaluation, review and claim the qualifications of graduate and master" approved by the CG: 19-December 2013), the completion of the assessment test in question, in the last week class of the semester. The rating of at least the first 2 tests (50% of total), be made at least 3 days before the date set for the start of the evaluation period in the academic calendar, without prejudice to the publication of the final provisional ratings, having no overall assessment test matter, with 7 days before the end date of the closing of records. The second time (July), a single theoretical examination computing the 40% of the total, which have to reach 4 points out of 10 to proceed to this computation is scheduled. (See comments and other indications of this teaching guide). The objective test may be essentially one of the following two ways: 1 - SHORT ANSWER TEST (TYPE-VIÑETAS). At the first opportunity will consist of 4 tests with 4 questions each in principle with the same score each, otherwise it will indicate the margin the corresponding score. Time 16 minutes. The second time will be composed of one test with 5 questions in principle with the same score each, otherwise it will indicate the margin the corresponding score. Time 20 minutes. Responses to ink will adhere to the area I boxed for each. Originally examination students may not leave the room or leave the table-board working to end (except for just cause) and have collected all the students on the test. All graphic details will be made provided with precise information (dimensions, designations, etc..) For proper definition and / or interpretation by a supervisor. 2 - MULTIPLE ANSWERS TEST (TYPE-TEST). At the first opportunity will be composed of 4 tests with 10 questions each. The valuation of the questions is the same for each, can be three cases: correct Replies +1.00 points, -0.60 points erroneous response, blank responses + / -0.00 points. Time 6 minutes. The second time will be composed of one test with 20 questions. The valuation of the questions is the same for each, can be three cases: correct Replies +0.50 points, -0.30 points erroneous response, blank responses + / -0.00 points. Time 12 minutes. The answer is considered correct is marked with a cross (X) in ink in the appropriate box. Any amended answer is void. There is always one and only one correct answer. Initiated any objective test modes listed above, students may not leave the room, or leave the table-board working to end (except for just cause) and have collected all the students on the test. (See comments and other indications of this teaching guide).	80
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Workshop	B7 B9 B13 B15 B21 B30 C1 C3 C4 C5 C6 C7 C8	SIGNATURE OF 12 ITEMS: Of the 12 items that arise if evaluate and assess positive over 2/3 of them summative score would be obtained as follows: the 12% of the total item valuation that is 2 points is reached, 11 items obtained 1.5 points, 1 point with 10 items, with 9 items 0.5 and 8 items or less no points would increase under this heading. These points are summative, ie you will increase the set of other tests, provided that the same minimum and medium identified, greater than or equal to four (4.0) are met; and in all of them (jobs, internships, objective tests and essay tests-development) greater or equal to five note (5.0) is obtained. (See comments and other indications of this teaching guide). Given the nature of the items and the nature of continuous assessment with no final test established in the art, non-positive valuation of more than two thirds of them involve a grade of NP (not shown) at the first opportunity, indicating that on the second occasion (July), this requirement is set to nO imperative, since his character is not exportable to the opportunity. The 12 items that arise and value are: 1 - Attendance at lectures. Positively to compute the item, you must have at least 80% of classes taught. .2 - Attendance at interactive classes: Same as above 3 ?Punctuality at lectures. Positively to compute the item, it must be at least 80% in the classes given. Be understood positively not enter class later than 5 minutes after the time set in the middle. . 4 ? Punctuality at interactive classes: The same as above 5.-Attention to lectures: To compute the item positively must have a minimum of 80% in the classes given. Attitudes such as NO use of mobile or any other device for unscheduled topics or issues in class (unless the professor stated at the beginning of the class waiting for a message or call urgent), proximity within the group is understood to positively teacher or focus, consensus standard classroom between teacher and students (not away, hide, barricade, etc..), in a clear sign of disinterest. 6 ? Attention to lectures. The same as above. 7.-Portfolios manuscript notes of lectures: To compute the item positively must have a minimum of 80% in the classes given. It will consist of the student in each class take minimal notes or manuscripts that consider the extension on those aspects or considerations it deems necessary or essential to complete and further develop the topics covered. With the particularity that on top of the sheet used to record the date that class, subgroup, full name, in that order. With these notes a physical or virtual portfolio will be created, as indicated by each teacher and will be given in the schedule of dates that is made in the early going and always before performing any of the objective tests scheduled (theoretical examinations). 8 - Portfolios of handwritten notes interactive classes. Same as above ... and always before performing any of the tests scheduled test-development (practical exams). 9 - Monitoring the delivery and presentation standards established in papers, practical and objective tests and test-development. Positively to compute the item, you must have a minimum of 80% of the work and practices according to the rules of delivery and presentation. That is, five (5) out of six (6). And the objective and test-development tests (exams), identified as specified. 10.-Observing the rules of inclusion and presentation of the literature on group work: To compute the item positively must have a minimum of 100% of the group work according to the rules of inclusion and presentation bibliography therein. That is, two
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(2) of a total of two (2). ISO 690-2010, first element-date with quote by superscript footnotes will be used. The literature will comprise at least the following documentary sources consulted: Monograph 3, 2 Standards and 1 Website page.

11.-Group work, oral presentation: To compute the item positively to each member of the group, must be at least 100% of group work submitted under the guidelines established for them. That is, two (2) of a total of two (2). It consist of at least each student must submit a piece of work interacting with the parties to submit their colleagues how they see fit, being able to adequately respond to the clarifications thereon are developed by their peers or teacher.

12.-Group work, audiovisual presentation: Same as above ... Each student will complete and support his presentation with audio-visual presentation support the group has done (PowerPoint or similar, board, etc..).

(See comments and other indications of this teaching guide).



Assessment comments

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Sources of information



Basic	REFERENCIAS BIBLIOGRÁFICAS CONSTRUCCIÓN III OBSERVACIONES: En el campo [Resumen], se indica, con tres asteriscos la bibliografía básica, con dos la de apoyo y con uno la recomendada para consulta o ampliación de cuestiones puntuales. También se reseña el Centro de la UDC donde localizarla con sus signaturas, que se completaran con las ediciones más recientes. Apartados: Tratados Generales, Normas y Hormigón. TRATADOS GENERALES Enciclopedia de la construcción. Barcelona: Editores Técnicos Asociados, 1974; 1979. 9 v; Contiene: T.I : Detalles de arquitectura -- T.II : Cálculos y ensayos, estudios de los proyectos de proyectos I -- T.III : Cálculos y ensayos, estudios de los proyectos II. T.IV : Ejemplos de arquitectura I -- T.V : Ejemplos de arquitectura II -- T.VI : Técnicas de construcción I -- T. VII : Técnicas de construcción II. ISSN/ISBN: 84-7146-124-2. [Resumen: *. EUAT: 69/0001]. AVENDAÑO PAISAN, Ramiro. Construcción I. Tecnología de la edificación. 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Complementary	
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Recommendations

Subjects that it is recommended to have taken before

Structures II/670G01025
Pathology and Rehabilitation/670G01029
Structures III/670G01034
Experimental Structure Inspection Methods/670G01039
Galician Architectural Heritage/670G01041

Subjects that are recommended to be taken simultaneously

Geometry of Illustrations/670G01018
Structures I/670G01019

Subjects that continue the syllabus

Mathematics I [In extinction]/670G01001
Applied Physics I [In extinction]/670G01002
Materials I [In extinction]/670G01003
Descriptive Geometry [In extinction]/670G01004
Mathematics II [In extinction]/670G01006
Applied Physics II [In extinction]/670G01007
Architectural Graphic Expression I [In extinction]/670G01008
Construction I [In extinction]/670G01009
Construction II/670G01011
Materials II/670G01012
Architectural Graphic Expression II/670G01013
Materials III/670G01016

Other comments

Dado que el perfil principal de la asignatura esta referenciado a la "construcción estructural", se considera que cuanto mayor sea el conocimiento sobre estructuras, materiales; así como una amplia y desarrollada visión espacial junto con una soltura fluida en la expresión gráfica; son fundamentales para un menor esfuerzo y tiempo requerido a la hora de la comprensión y resolución de los aspectos tratados en la asignatura....//...

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