



Teaching Guide				
Identifying Data				2019/20
Subject (*)	Structural Design	Code	630519002	
Study programme	Mestrado Universitario en Arquitectura			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	Yearly	First	Obligatory	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Construcións e Estruturas Arquitectónicas, Cívís e AeronáuticasEnxeñaría Civil			
Coordinador	Estévez Cimadevila, Francisco Javier	E-mail	javier.estevezc@udc.es	
Lecturers	Estévez Cimadevila, Francisco Javier Suárez Riestra, Félix Leandro	E-mail	javier.estevezc@udc.es felix.suarez@udc.es	
Web				
General description	Arquitectura y diseño estructural Documentación del proyecto de estructuras.			

Study programme competences / results	
Code	Study programme competences / results
A1	Ability to conceive, calculate, design and integrate in buildings and urban developments and implement: Building structures (T)
A9	Ability to preserve, restore and renovate the built heritage (T)
A12	Development, presentation and public review, once the student has all credits, undergraduate and master's degree, of an original exercise done individually, before a university jury including at least one prestigious professional proposed by the professional associations. The exercise will consist of a comprehensive architectural design of professional nature in which all the skills acquired in the degree and master's degree, are developed to an extent of demonstrating sufficiency to guarantee the full execution of the construction works according to technical and administrative regulations (T)
B1	Students have the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous
B2	Have knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context
B3	Students can apply acquired knowledge and ability to solve problems in new or unfamiliar environments within broader or multidisciplinary contexts related to their field of study
B4	Students are able to integrate knowledge and handle complexity and formulate judgements based on information that is incomplete or limited, including reflection on social and ethical responsibilities linked to the application of their knowledge and judgements
B5	Students can communicate their conclusions and the knowledge and the rationale supporting them to specialists and non-specialists in a clear and unambiguous way
B6	Knowing the methods of research and preparation of construction projects
B7	Creating architectural designs that meet both aesthetic and technical requirements and the needs of users within the limits imposed by cost factors and building regulations
B8	"Understanding the architectural profession and its role in society, in particular, elaborating projects that take into account the social factors "
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		
Aptitud para concebir, calcular, diseñar e integrar en edificios y conjuntos urbanos y ejecutar: Estructuras de Edificación.	AC1 AC9 AC12	BC1 BC2 BC3 BC4 BC5 BC6 BC7 BC8	CC1 CC3 CC4 CC5 CC6 CC7 CC8

Contents	
Topic	Sub-topic
Arquitectura y diseño estructural	.
El sistema estructural	.
El proyecto de estructuras. Representación	.
Proyecto de estructuras. Hormigón armado	.
Proyecto de estructuras. Acero	.
Proyecto de estructuras. Madera	.
Geotecnia y cimentaciones	.
Elementos de contención	.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 A9 B4 B5 B6 B7 B8 C1 C3 C7 C8	20	20	40
Supervised projects	A1 A9 A12 B1 B2 B3 B4 B5 B7 B8 C1 C3 C4 C5 C6 C7	18	50	68
Workshop	A1 A9 A12 B1 B2 B3 B4 B5 B6 B7 B8 C1 C3 C4 C6 C7	20	20	40
Personalized attention		2	0	2

(\*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	Una parte de la actividad presencial se desarrolla a través del método expositivo fomentando, no obstante, involucrar al alumno en la etapa de desarrollo del tema expuesto, proporcionándole la oportunidad para formular preguntas y expresar ideas, conduciéndole de esta manera , por influencia indirecta, al proceso de aprendizaje. Dado el tipo de materia, la exposición se realiza con una amplia utilización de medios audiovisuales.
Supervised projects	La realización de trabajos tutelados constituye en esta materia una metodología básica y fundamental para la adecuada formación del alumno. Ello es así pues permite enfrentarse a las situaciones reales que formarán parte de su ejercicio profesional, debiendo conocer el proceso y las implicaciones que tiene la toma de decisiones sobre el proyecto estructural de una obra de arquitectura.  Esta metodología permite no solo la consolidación y aclaración de los conceptos adquiridos en las sesiones magistrales, sino también implementar los conocimientos que se van aportando adquiriendo así una práctica de manejo de los mismos.



Workshop	La materia participa en el Taller PFM, donde se integran igualmente Proyecto de Construcción, Proyecto de Instalaciones, Proyectos Avanzados e Instrumentos de Intervención Urbanística . El taller se entiende como un espacio de trabajo e intercambio concebido para facilitar la confluencia de los contenidos de las diferentes asignaturas en torno al proyecto arquitectónico, y por tanto se basa en la integración multidisciplinar sobre la resolución de casos prácticos.
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### Personalized attention

Methodologies	Description
Workshop Guest lecture / keynote speech Supervised projects	Una metodología orientada hacia el aprendizaje requiere la consideración de las singularidades que distancian a unos alumnos de otros dentro de un mismo grupo, en términos de formación previa, posibles carencias, actitudes y aptitudes, expectativas y motivaciones. Esta cuestión adquiere mayor trascendencia en el desarrollo de los trabajos tutelados y los proyectos propuestos a nivel de taller, cuya metodología sólo adquiere sentido si se produce un contacto regular y periódico con el profesorado a fin de optimizar y en su caso reconducir las actividades en curso.

### Assessment

Methodologies	Competencies / Results	Description	Qualification
Workshop	A1 A9 A12 B1 B2 B3 B4 B5 B6 B7 B8 C1 C3 C4 C6 C7	Se valorarán los resultados obtenidos en el taller teniendo en cuenta su seguimiento por parte del alumno, la complejidad de la solución estructural, su adecuación a la propuesta arquitectónica, así como su desarrollo tanto a nivel de cálculo como gráfico.	20
Supervised projects	A1 A9 A12 B1 B2 B3 B4 B5 B7 B8 C1 C3 C4 C5 C6 C7	Dichas pruebas contemplarán el diseño y el desarrollo de trabajos vinculados al proyecto de estructuras de edificación.	80

### Assessment comments

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### Sources of information

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<p><b>Basic</b></p>	<p>Charleson, Andrew La estructura como arquitectura Ed. Reverté, Barcelona, 2007. ISBN 978-842912117          Ching, Francis D. k. Building structures illustrated. Patterns, systems and design Ed. John Wiley &amp; Sons, New Jersey, 2009. ISBN 978 0470187852          Conzett, Jürg Structure and Space Ed. Architectural Association, Londres, 2006. ISBN 978 1902902012          Cruz, Paulo J.S. (ed.) Structures and Architecture: new concepts, applications and challenges Ed. CRC Press (Taylor &amp; Francis Group), New York, 2013. ISBN 978 1482224610          Deaplazes, Andrea Constructing architecture: material processes structures Ed. Birkhäuser Publishers for architecture, Basel, 2005. ISBN 978 3764373199          Engel, Heino Sistemas de estructuras Ed. Gustavo Gili, Barcelona, 2009. ISBN 978-8425218002          Frampton, Kenneth Estudios sobre cultura tectónica Ed. Akal Arquitectura, Madrid, 1999. ISBN 978-8446011875          Garrison, Philip Basic Structures for enginners and architects Ed. John Wiley and sons, New Jersey, 2005. ISBN 978 1405120531          Gutai, Matyas Trans Structures: fluid architecture and liquid engineering Ed. Actar D, Barcelona, 2015, 9781940291444          Harris, James B. Masted Structures in Architecture Ed. Architectural Press, New York, 1996. ISBN 0750612827          Howard, Herbert S. Structure. An architect's approach Ed. McGraw-Hill Book Company, New York, 1966          Lim, Joseph Eccentric structures in architecture Ed. BIS Publishers, Amsterdam, 2010, 978 9063692421          Mainstone, Rowland J. Structure in Architecture: History, design and innovation Ed. Ashgate, Michigan University, 1999. ISBN 9780860787631          McDonal, Angus J. Structure and Architecture Ed. Architectural Press, Oxford, 2001. ISBN 0750647930          Moore, Fuller Understanding structures Ed. MacGraw Hill, Barcelona, 1999. ISBN 9780070432536          Muttoni, Aurelio The art of structures: introduction to the functioning of structures in architecture Ed. EPFL Press, Laussane, Suiza, 2011. ISBN 978-2940222384          Nervi, Pier L. Aesthetics and technology in buildings Ed. Harvard University Press, Cambrigde, 1965          Nervi, Pier L. Nuevas estructuras Ed. Gustavo Gili, Barcelona, 1973. ISBN 0262640023          Ramsey, Dabby Structure for architects: a primer Ed. John Wiley and sons, New Jersey, 2012. ISBN 978 0470633762          Rogers, Richard Architecture: a modern view Ed. Thames &amp; Hudson, New York, 1992. ISBN 978 0500342930          Sánchez Vibaek, Kasper Architectural system structures: integrating desing complexity in industrialised construction Ed. Routledge Research in Architecture, Abingdon, 2014. ISBN 978 0415828543          Sandaker, Bjorn Normann On span and space: exploring structures in architecture Ed. Routledge (Taylor &amp; Francis Group), Abingdon, 2008. ISBN 978 113432525          Sandaker, Bjorn Normann The structural basis of architecture Ed. Routledge (Taylor &amp; Francis Group), Abingdon, 2011. ISBN 978 0415415453          Siegel, Curt Formas estructurales de la arquitectura moderna Ed. Continental, México, 1966          Spuybroek, Lars The structure of vagueness. Performative architecture beyond instrumentality Ed. Spon Press (Taylor and Francis Group), New York, 2005. ISBN 978-0203017821          Torroja Miret, Eduardo Razón y ser de tipos estructurales Ed. Textos Universitarios CSIC, Madrid, 2004. ISBN 978 8400092825          Wilson, Forrest Structure: the essence of architecture Ed. Van Nostrnad Reinhold, Pennsylvania University, 1983. ISBN 9780442290993          Zalewski, Waclaw Shapin structures: statics Ed. John Wiley &amp; Sons, New Jersey, 1998. ISBN 978 0471169680</p>
<p><b>Complementary</b></p>	

**Recommendations**

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Advanced Architectural Design/630519005

Construction Design/630519001

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.