



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	Construccións e Estruturas Arquitectónicas, Civís 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	
Code	Study programme competences
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
Aptitud para concebir, calcular, diseñar e integrar en edificios y conjuntos urbanos y ejecutar: Estructuras de Edificación.			AC1 BC1 CC1 AC9 BC2 CC3 AC12 BC3 CC4 BC4 CC5 BC5 CC6 BC6 CC7 BC7 CC8 BC8

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	Ordinary class hours	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	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.
Guest lecture / keynote speech	
Supervised projects	

Assessment			
Methodologies	Competencies	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

Sources of information



Basic	Charleson, AndrewLa estructura como arquitecturaEd. Reverté, Barcelona, 2007. ISBN 978-842912117Ching, Francis D. k.Building structures illustrated. Patterns, systems and designEd. John Wiley & Sons, New Jersey, 2009. ISBN 978 0470187852Conzett, JürgStructure and SpaceEd. Architectural Association,Londres, 2006. ISBN 978 1902902012Cruz, Paulo J.S. (ed.)Structures and Architecture: new concepts, applications and challengesEd. CRC Press (Taylor & Francis Group), New York, 2013. ISBN 978 1482224610Deaplaces, AndreaConstructing architecture: material processes structures Ed. Birkhäuser Publishers for architecture, Basel, 2005. ISBN 978 3764373199Engel, HeinoSistemas de estructurasEd. Gustavo Gili, Barcelona, 2009. ISBN 978-8425218002Frampton, KennethEstudios sobre cultura tectónicaEd. Akal Arquitectura, Madrid, 1999. ISBN 978-8446011875Garrison, PhilipBasic Structures for engineers and architectsEd. John Wiley and sons, New Jersey, 2005. ISBN 978 1405120531Gutai, MatyasTrans Structures: fluid architecture and liquid enginneringEd. Actar D, Barcelona, 2015, 9781940291444Harris, James B.Masted Structures in ArchitectureEd. Architectural Press, New York, 1996. ISBN 0750612827Howard, Herbert S.Structure. An architect's approachEd. McGraw-Hill Book Company, New York, 1966Lim, JosephEccentric structures in architectureEd. BIS Publishers, Amsterdam, 2010, 978 9063692421Mainstone, Rowland J.Structure in Architecture: History, design and innovationEd. Ashgate, Michigan University, 1999. ISBN 9780860787631McDonal, Angus J.Structure and ArchitectureEd. Architectural Press, Oxford, 2001. ISBN 0750647930Moore, FullerUnderstanding structuresEd. MacGraw Hill, Barcelona, 1999. ISBN 9780070432536Muttoni, AurelioThe art of structures: introduction to the functioning of structures in architectureEd. EPFL Press, Laussane, Suiza, 2011. ISBN 978-2940222384Nervi, Pier L.Aesthetics and technology in buildingsEd. Harvard University Press, Cambrigde, 1965Nervi, Pier L.Nuevas estructurasEd. Gustavo Gili, Barcelona, 1973. ISBN 0262640023Ramsey, DabbyStructure for architects: a primerEd. John Wiley and sons, New Jersey, 2012. ISBN 978 0470633762Rogers, RichardArchitecture: a modern viewEd. Thames & Hudson, New York, 1992. ISBN 978 0500342930Sánchez Vibaek, KasperArchitectural system structures: integrating desing complexity in industrialised constructionEd. Routledge Research in Architecture, Abingdon, 2014. ISBN 978 0415828543Sandaker, Bjorn NormannOn span and space: exploring structures in architectureEd. Routledge (Taylor & Francis Group), Abingdon, 2008. ISBN 978 113432525Sandaker, Bjorn NormannThe structural basis of architectureEd. Routledge (Taylor & Francis Group), Abingdon, 2011. ISBN 978 0415415453Siegel, CurtFormas estructurales de la arquitectura modernaEd. Continental, México, 1966Spuybroek, LarsThe structure of vagueness. Performative architecture beyond instrumentalityEd. Spon Press (Taylor and Francis Group), New York, 2005. ISBN 978-0203017821Torroja Miret, EduardoRazón y ser de tipos estructuralesEd. Textos Universitarios CSIC, Madrid, 2004. ISBN 978 8400092825Wilson, ForrestStructure: the essence of architectureEd. Van Nostrand Reinhold, Pennsylvania University, 1983. ISBN 9780442290993Zalewski, WaclawShapin structures: statics Ed. John Wiley & Sons, New Jersey, 1998. ISBN 978 0471169680
Complementary	

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.