



| Teaching Guide      |   |        |   |         |
|---------------------|---|--------|---|---------|
| Identifying Data    |   |        |   | 2018/19 |
| Subject (*)         | Structures II   | Code   | 670G01025   |         |
| Study programme     | Grao en Arquitectura Técnica  |        |   |         |
| Descriptors         |   |        |   |         |
| Cycle               | Period  | Year   | Type  | Credits |
| Graduate            | 1st four-month period   | Third  | Obligatory  | 6       |
| Language            | Spanish   |        |   |         |
| Teaching method     | Face-to-face  |        |   |         |
| Prerequisites       |   |        |   |         |
| Department          | Construcións e Estruturas Arquitectónicas, Cívicas e Aeronáuticas Enxeñaría Civil   |        |   |         |
| Coordinador         | Otero Chans, M. Dolores   | E-mail | dolores.otero.chans@udc.es  |         |
| Lecturers           | Dominguez Diez, Eloy Rafael<br>Mosquera Rey, Emilio<br>Otero Chans, M. Dolores  | E-mail | eloy.dominguez@udc.es<br>emilio.mosquera@udc.es<br>dolores.otero.chans@udc.es |         |
| Web                 | moodle.udc.es   |        |   |         |
| General description | <p>Introducción a las estructuras de edificación.</p> <p>Acciones en la edificación</p> <p>Seguridad estructural.</p> <p>Estructuras de acero.</p> <p>Estructuras de madera.</p> <p>Estructuras de fábrica.</p> |        |   |         |

| Study programme competences |  |
|-----------------------------|--|
| Code                        | Study programme competences  |
| A2                          | Adquirir os coñecementos fundamentais sobre os sistemas e aplicacións informáticas específicos e xerais utilizados no ámbito da edificación.   |
| A8                          | Deseñar, calcular e executar estruturas de edificación.  |
| A29                         | Elaborar estudos, certificados, ditames, documentos e informes técnicos.   |
| B1                          | Capacidade de análise e síntese.   |
| B2                          | Capacidade de organización e planificación.  |
| B3                          | Capacidade para a procura, análise, selección, utilización e xestión da información.   |
| B4                          | Coñecementos de informática relativos ao ámbito de estudo.   |
| B5                          | Capacidade para a resolución de problemas.   |
| B6                          | Capacidade para a toma de decisións.   |
| B8                          | Capacidade para traballar nun equipo de carácter interdisciplinario.   |
| B16                         | Capacidade de aplicar os coñecementos na práctica.   |
| B29                         | Actitude vital positiva fronte ás innovacións sociais e tecnolóxicas.  |
| C1                          | Adequate oral and written expression in the official languages.  |
| C3                          | Using ICT in working contexts and lifelong learning.   |
| 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 |
|                   |                             |



|   |                 |  |                                  |
|---|-----------------|--|----------------------------------|
| Conocer y aplicar las acciones en el análisis de las estructuras de edificación.                      | A8<br>A29       | B16  | C3                               |
| To know and to understand the basic concepts and fundamentals of the structural security.             | A2<br>A8<br>A29 | B4<br>B5<br>B6<br>B8<br>B16<br>B29                   | C1<br>C3<br>C5<br>C6<br>C7<br>C8 |
| Capacity to analyse and verify different timber structures in buildings. Solid timber, glulam timber. | A2<br>A8<br>A29 | B1<br>B2<br>B3<br>B4<br>B5<br>B6<br>B8<br>B16<br>B29 | C1<br>C3<br>C5<br>C6<br>C8       |
| Capacity to analyse and verify masonry structures in buildings.                                       | A2<br>A8<br>A29 | B1<br>B2<br>B3<br>B4<br>B5<br>B6<br>B16              | C1<br>C3<br>C5<br>C6<br>C8       |

| Contents                   |  |
|----------------------------|--|
| Topic                      | Sub-topic  |
| INTRODUCTION TO STRUCTURES | Actions<br>Structural safety<br>Types of structures<br>Structural representation   |
| STEEL STRUCTURES           | Calculus basis<br>Modelling and classification<br>Resistant verification of sections<br>Measuring of structural elements |
| TIMBER STRUCTURES          | Typologies<br>Wood as a structural material<br>Calculus criteria. Resistance<br>Calculus criteria. Deflection            |
| MASONRY STRUCTURES         | Typologies<br>Calculus basis<br>Resistant verification in non reinforced masonry   |

| Planning                       |                                     |                      |                               |             |
|--------------------------------|-------------------------------------|----------------------|-------------------------------|-------------|
| Methodologies / tests          | Competencies                        | Ordinary class hours | Student?s personal work hours | Total hours |
| Guest lecture / keynote speech | A8 B1 B4 B5 C1 C2<br>C3 C5 C6 C7 C8 | 30                   | 30                            | 60          |
| Problem solving                | A8 B2 B3 B8 B16 B29<br>C3 C6 C7     | 22                   | 33                            | 55          |



|                                 |  |   |    |    |
|---------------------------------|--|---|----|----|
| Supervised projects             | A2 A8 A29 B3 B4 B6<br>B16 C1 C3 C5 C6 C7<br>C8 | 4 | 20 | 24 |
| Mixed objective/subjective test | A8 B1 B2 B5 B6 B16<br>C1 C6                    | 4 | 6  | 10 |
| 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  | An important part of the in-person class will be developed basically through an expositive method. Nevertheless the student will be involved in the class during the development stage of the topic exposed, as far as it is possible. With this method the student will be given the chance to ask questions and to express his ideas, conducting the pupil to the learning process. Audio-visual and technological media will support the explanation.   |
| Problem solving                 | Practical tests to verify the student knowledge are a significantly important part in this subject. Even though on their own practical tests do not conduct to the knowledge of the topics, they allow the consolidation and clarification of the concepts acquired in the previous master classes. The professor, by the students or in an intermediate way, could hold its resolution.<br><br>For the students enrolled in the ?International Semester? this part of the subject will be evaluated through the guided work developed in the workshop based on a project methodology. |
| Supervised projects             | The student will develop a variety of works during the course with the assistance of the professor. The students will have do and hand over the works in correspondence with the particular rules that will be established for each one of the proposed topics.<br><br>For the students enrolled in the ?International Semester? this part of the subject will be evaluated through the guided work developed in the workshop based on a project methodology.  |
| Mixed objective/subjective test | There will be written tests with the aim of evaluating the knowledge level and competences acquired by the student. For that purpose the tests will evaluate the theoretical contents comprehension and the practical skills acquired.   |

| Personalized attention  |             |
|---|-------------|
| Methodologies   | Description |
| Problem solving<br>Guest lecture / keynote speech<br>Mixed objective/subjective test<br>Supervised projects | .           |

| Assessment                      |                                 |             |               |
|---------------------------------|---------------------------------|-------------|---------------|
| Methodologies                   | Competencies                    | Description | Qualification |
| Problem solving                 | A8 B2 B3 B8 B16 B29<br>C3 C6 C7 | .           | 0             |
| Mixed objective/subjective test | A8 B1 B2 B5 B6 B16<br>C1 C6     | .           | 80            |



|                     |  |   |    |
|---------------------|--|---|----|
| Supervised projects | A2 A8 A29 B3 B4 B6<br>B16 C1 C3 C5 C6 C7<br>C8 | . | 20 |
|---------------------|--|---|----|

### Assessment comments

|   |
|---|
| . |
|---|

### Sources of information

|                      |  |
|----------------------|--|
| <b>Basic</b>         | <ul style="list-style-type: none"> <li>- FIOL FEMENIA, FRANCISCO (2008). Acciones en la edificación : exposición y ejemplos de acuerdo con los documentos básicos SE y SE-AE. Burgos.</li> <li>- ARGUELLES ÁLVAREZ, RAMÓN (2005). Estructuras de acero. Madrid. Bellisco, 2ª ed. ampl. y act.</li> <li>- HURTADO MINGO, CONSTANTINO (2008). Estructuras de acero en la edificación. Madrid. APTA.</li> <li>- CUDÓS SAMBLANCAT, VICENTE (1988). Estructuras metálicas. Madrid. Escuela de la edificación</li> <li>- ENSIDESA (1977-1982). Prontuario ENSIDESA manual para cálculo de estructuras metálicas. Oviedo. Ensidesa</li> <li>- ARGÜELLES ÁLVAREZ, RAMÓN (2000). Estructuras de madera : diseño y cálculo. Madrid. AITIM</li> <li>- ADELL ARGILES, J.M. et alt (1992). El muro de ladrillo. Madrid. Hyspalit</li> <li>- CTE (2010). Código tecnico de la edificación. Ministerio de Fomento. codigotecnico.org</li> <li>- RODRÍGUEZ NEVADO, M.A. (1999). Diseño estructural en madera una aproximación en imágenes al estado del arte europeo a finales del siglo XX. Madrid. AITIM</li> <li>- FONBELLA GUILLÉN, R. (1994). Estructuras de ladrillo. Madrid: Fundación escuela de la edificación</li> <li>- MARTIN, L.H. et PURKISS, J.A. (2008). Structural design of steelwork to EN 1993 and EN 1994. Elsevier</li> <li>- GARDNER, I et NETHERCOT, D. A. (2011). Designers' guide to Eurocode 3: design of steel buildings: EN 1993-1-1, -1-3 and -1-8. Thomas Telford</li> <li>- PORTEOUS, J. et KERMANI, A. (2007). Structural timber design to Eurocode 5. Blackwell Pub. Co</li> <li>- LARSEN, H. and ENJILY, V. (2009). Practical design of timber structures to Eurocode 5. Thomas Telford</li> <li>- EUROCODES (1, 3, 5 AND 6) (). .</li> </ul> |
| <b>Complementary</b> | <ul style="list-style-type: none"> <li>- GORDON, J.E. (1999). Estructuras o por qué las cosas no se caen.. Madrid. Celeste</li> <li>- TORROJA, E. (1991). Razón y ser de los tipos estructurales. Madrid. Consejo Superior de Investigaciones Científicas I.E.T.C.C.</li> <li>- ITEA (2000). Programa Europeo de formación en cálculo y diseño de la construcción en acero. Guipuzcoa. ITEA</li> <li>- GÓMEZ SÁNCHEZ, I. (2006). Las estructuras de madera en los tratados de arquitectura (1500-1810). Madrid. AITIM</li> <li>- PEREZA SÁNCHEZ, J.E. (1994). Viviendas de madera. Madrid. AITIM</li> <li>- HERZOG, T.; NATTERER, J. (2005). Construire en bois. Laussane: Presses polytechniques et univertaires normandes</li> <li>- NATTERER, J. et alli (1998). CONSTRUIRE EN BOIS (1) (2). Laussane: Presses polytechniques et univertaires normandes</li> <li>- ESTÉVEZ, J.; MUÑIZ, S. (2007). Estructura de fábrica. A Coruña: Reprografía del Noroeste</li> <li>- DIESTE, E. (1987). La estructura cerámica. Bogotá: Escala</li> <li>- EAE (2011). Instrucción de acero estructural. Ministerio de la Presidencia</li> </ul>   |

### Recommendations

#### Subjects that it is recommended to have taken before

Mathematics I/670G01001  
Applied Physics I/670G01002  
Mathematics II/670G01006  
Construction II/670G01011  
Structures I/670G01019

#### Subjects that are recommended to be taken simultaneously



| Subjects that continue the syllabus |
|-------------------------------------|
| Structures III/670G01034            |
| 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.