UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2016/17
Subject (*)	Estruturas 1		Code	630G01019
Study programme	Grao en Arquitectura			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatoria	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Tecnoloxía da Construción			
Coordinador	Muñoz Vidal, Manuel	E-mail	manuel.munoz@udc.es	
Lecturers	Muñoz Vidal, Manuel	E-mail	manuel.munoz@udc.es	
Web				
General description	Knowledge Theory of Elasticity and Strength of Materials			

Study programme competences	
Code	Study programme competences
A56	BASES DE MECÁNICA XERAL: comprensión ou coñecemento dos principios da mecánica básica e aplicada, a estática, a xeometría de masas e os campos vectoriais e tensoriais necesarios para entender as condicións de equilibrio dos edificios e obras civís e de urbanización.
A57	MECÁNICA ESTRUCTURAL E DO TERREO: comprensión ou coñecemento dos principios de mecánica de sólidos e de medios continuos, dos de mecánica do solo e das calidades plásticas, elásticas e de resistencia dos distintos materiais empregados en estruturas portantes, obra civil e cimentacións.
A58	MATERIAIS DE CONSTRUCCIÓN: comprensión ou coñecemento das características físicas e químicas, os procedementos de fabricación e homologación, a análise patolóxica e as aplicacións e restricións de uso dos materiais empregados en obra estrutural, civil, grosa e acabada.
B2	Resolver problemas de forma efectiva.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar de forma colaborativa.
B7	Comunicarse de maneira efectiva nun entorno de traballo.
B11	Capacidade de análise e síntese.
B15	Capacidade de organización e planificación.
B21	Intuición mecánica.
B22	Traballo en colaboración con responsabilidades compartidas.
B24	Coñecementos de informática relativos ao ámbito de estudo.

Learning outcomes			
Learning outcomes	Study programme competences		
Knowledge of Elasticity, Plasticity and Strength of Materials. Indeterminate systems. Numerical and computer methods of structural analysis.	A56 A57 A58	B2 B4 B5 B7 B11 B15 B21 B22 B24	

The student will acquire skills for pre-dimensioning, design, calculation and testing of structures and to direct its material execution	A56 A57 A58	B4 B5 B7 B15	

Contents	
Topic	**Sub-topic**
01 STRESS STATE	1 Stress concept: Normal and tangential 2 Intrinsic components of the stress components 3 Stress in function of the orientation of the section 4 Graphical representations of the stress intrinsic components. Mohr circle. 5 Cauchy Theorem 6 Plane stress state 7 Main directions
02 DEFORMATIONS AND DISPLACEMENTS	1 Specific deformations 2 Angular deformations or angular rotations 3 Plane deformational state. Deformation tensor. 4 Intrinsic components graphic. Mohr circle. 5 Extensometry
03 MECHANIC RESPONSE OF THE MATERIALS	1 Elastic constants of the materials 2 Hooke´s law 3 Lame equations
04 MATERIALS RESISTANCE	1 Solid elastic concept. Mechanic prism. 2 Efforts. Section method. Equivalence equations 3 Relatively resilient and Bernoulli hypothesis. 4 Saint-Venant Principle and combining or overlay effects. 5 Stress-deformation diagrams. Mechanic properties 6 Fail Criteria 7 Introduction to Structural calculation. Limited States. 8 Probability methods and partial safety factors
05 AXIAL FORCE	1 Stress conditions and uniaxial deformational conditions 2 Strength of bars 3 Resolution of monoaxial hyperstatic problems 4 Introduction of the buckling problems. Euler critical load. 5 Introduction to axial plasticity.
06 SHEAR FORCE	1 Elemental theory 2 Connecting elements 3 Smugglers calculation
07 PURE BENDING	1 Hypothesis or assumptions and general solutions 2 Simetric pure bending. Navier law. Resistant module 3 Sections calculation 4 Differential equations or the elastic line. 5 Plasticity introduction in pure bending
08 SIMPLE BENDING	1 Colignon formulation 2 Principal stress. Isostatic 3 Beams calculations
09 DEVIATION BENDING	1 Normal and shear stresses 2 Bend allowance 3 Analysis of deformations

10 BENDING (COMPOUND FLEXURE)	1 Normal and shear stresses. Neutral axis 2 Pressure center and neutral axis 3 Central core or central nucleus. Concept. Determination.
11 TORSION	1 Simple torsion and pure torsion. 2 Torsion in cylindrical bars. Coulomb theory. 3 Torsion in no circular cross-section prisms 4 Design consideration in elements with torsion

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Objective test	A56 A57 A58 B2 B4 B5 B7 B11 B15 B21 B22 B24	4	144	148
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
Objective test	Individual practices throughout the course

Personalized attention	
Methodologies	Description
	Please direct students to the ward focus and work for discussion and solution of theoretical questions and troubleshooting

Assessment			
Methodologies	Competencies	Description	Qualification
Objective test	A56 A57 A58 B2 B4 B5 B7 B11 B15 B21 B22 B24	PARTIAL TEST - Troubleshooting - Mastery of theoretical knowledge - Structuring content - Planning, clarity and precision - Mastering the art of operational	100

Assessment comments

One possible continuous assessment as intended, so to pass the course must complete and submit a series of tests and work along the same.
For the processing of the material, the delivery of virtual or electronic record of the student will be detailed as requested.
Facing the course note the following aspects, which have a different weight in the final grade, as broken down in the table of assessment will be assessed:
* Class attendance is mandatory understood, verifying by means of interactive practices, with the ability to use the notes and the material that the teacher sees fit. These practices will be made without notice.
* Throughout the course an overall practice or work directed by the teacher, the revisions will be made or specific monitoring will be developed, but the student will develop on their own. It is anticipated that this work will be developed in the group consisting of 4 students, and build capacity for organization and a cooperative attitude.
* Throughout the course about exams, which consist of questions, problem type, and may also contain conceptual topics will be made. Will be individual and will not be able to see some literature. Must obtain a minimun of 3 pts in each exam.
* In the final course opportunities will be a written test or examination to contain problems and a series of short questions of a theoretical nature. For the result of this test to join the rest of the course, you must obtain the same at least 3 out of 10, otherwise it is deemed not filed.
Satisfactorily overcoming the above aspects, students can obtain the approval of the course without having to go the final tests. 2nd student enrollment or later, they will follow the course in the same conditions as those of first enrollment to be eligible to pass the course.
* If it is not approved by course, in the first final opportunity of course there will be a written test or exam. The result of this test counted as partial evidence of progress. The assistance will be weighted as global practice during the course.
* In the second final suitability of course there will be a written test or exam containing problems and a series of short questions of theoretical nature. The student may submit this final test without having to meet any other requirement rather than included in the records of the subject. In this case the total weight of the note will be the test.
For the experiments and examination materials will be permitted only:
- ID card or other identification
- Material of writing and drawing
- Calculator
- A summary sheet of formulas
- Mobile phones is expressly prohibited

The offset will consider structuring content, order submission and accuracy of results. Take into account the errors of concepts generally considered very serious, and may nullify the whole exercise.

Sources of information	
Basic	
Complementary	1 BEDFORD, A.; LIECHTI, K. M. Mecánica de materiales. Prentice-Hall Inc. Pearson Educación deColombia Ltda. Bogotá, 2002.2 BYARS, E. F.; SNYDER, R. D. Mecánica de cuerpos deformables.Representación y Servicios de IngenieríaS.A. México, 1978. 3ª edición. 3 GERE, J. M.Timoshenko. Resistencia de materiales.Thomson. Madrid, 2002.5ª edición. 4 GONZÁLEZ TABOADA, J.A.Tensiones y deformaciones en materialeselásticos.Universidad de Santiago de Compostela, 1989. 5 ORTIZ BERROCAL, L.Elasticidad.Universidad Politécnica deMadrid. Madrid, 1985. 6 HIBBELER, R. C.Mecánica de materiales.Prentice Hall Hispanoamericana S.A. México,1998. 3ª edición. 7 ORTIZ BERROCAL, L.Resistencia de materiales.McGraw-Hill. Madrid, 2002. 2ª edición (1ª edición de1980). 8 POPOV, E. P.; BALAN, T. A. Mecánica de sólidos.Pearson Educación. México, 2000. 2ª edición.

Recommendations
Subjects that it is recommended to have taken before
Matemáticas I/670G01001 Fisica Aplicada I/670G01002
Subjects that are recommended to be taken simultaneously
Matemáticas II/670G01006 Construción I/670G01009
Subjects that continue the syllabus

Estruturas II/670G01025 Estruturas III/670G01034
Other comments
Previously reviewed the matter on which previous course work repeatedly, as is recommended: - Geometry mass - Resolution of articulated structures - Diagrams efforts beams and frames The continued treatment of the subject we recommend a review every day of what was discussed in class, planning the doubts that may arise in the next class or tutorial hours. Besides monitoring of classes, the student should consult the literature and recommended material for each part of the subject.