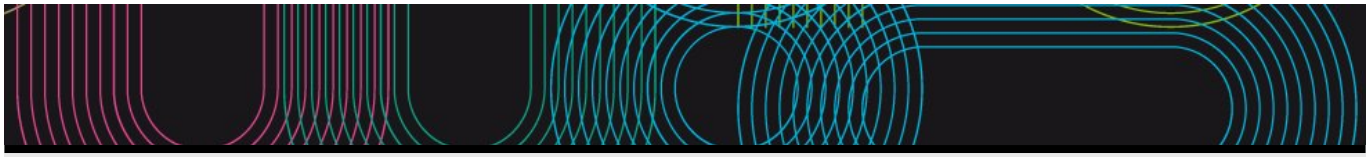

IDENTIFYING DATA				
Resistance of materials				
Subject	Resistance of materials			
Code	V12G380V01402			
Study programme	Degree in Mechanical Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish Galician			
Department	Materials Engineering, Applied Mechanics and Construction			
Coordinator	Caamaño Martínez, José Carlos Riveiro Rodríguez, Belén			
Lecturers	Caamaño Martínez, José Carlos Cabaleiro Núñez, Manuel Conde Carnero, Borja Fernández Abalde, Félix Fuentes Fernández, Eugenio Ignacio Ponte Suárez, José Riveiro Rodríguez, Belén			
E-mail	jccaam@uvigo.es belenriveiro@uvigo.es			
Web	http://faitic.uvigo.es			
General description	Introduction to linear elastic materials, and analysis of internal loadings, stress and strain relationships. Study of the fundamentals of mechanics of materials and particularization for shafts and beam structures.			

Competencies	
Code	
B3	CG3 Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.
B4	CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and the ability to communicate and transmit knowledge and skills in the field of industrial engineering in Mechanical specialty.
C14	CE14 Knowledge and use of the principles of strength of materials.
D1	CT1 Analysis and synthesis
D2	CT2 Problems resolution.
D9	CT9 Apply knowledge.
D10	CT10 Self learning and work.
D16	CT16 Critical thinking.
D17	CT17 Working as a team.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
To know the differences between rigid solid and elastic solid.	B3	C14	D1
To know the stress and deformation states in a deformable solid and the relationship between them.	B4		D2
			D9
Apply the acquired knowledge to the determination of the maximum values of stress at a point of a deformable solid.			D10
			D16
T know the basic principles governing the Mechanics of Materials.			D17
To know the relationships between the different stress resultants and the stresses.			
To apply the knowledge acquired to the determination of stress resultant diagrams.			
To apply the acquired knowledge about stresses applied to bar elements.			
To know the basics about deformations of bar elements.			
To apply the knowledge acquired to the dimensioning of bar elements.			

Phase equilibria. Evaporation, transport, mixing of waters, solubility of gases in the sea.

Contents	
Topic	
1. Introduction	1.1 Introduction 1.2 Review of statics fundamentals and applied concepts for further progress in solid mechanics and stress analysis
2. Basic principles of elasticity and mechanics of materials.	2.0 Stress and strain. Linear elastic materials 2.1. Normal stress in an axially loaded prismatic bar. 2.2. Equilibrium of a deformable body. 2.3. Stress-Strain diagram of ductile materials. Hooke's Law. 2.4. Stress resultants. Diagrams.
3. Axial loads	3.1. Normal forces. 3.2. Elastic deformation of an axially loaded member. 3.3. Statically governed problems. 3.4. Statically indeterminate problems. 3.5. Thermal stress and assembly misfits.
4. Bending	4.1 Beams: definition and types. Loads on beams. 4.2 Internal shear forces and bending moments. 4.3 External load, shear force and bending moment relationships. 4.4 Shear and moment diagrams 4.5 Pure bending and non-uniform bending. Hypothesis and limitations. 4.6. Normal stresses in unsymmetric bending. 4.7 Symmetric bending. The flexure formula (Navier's Law). 4.8 Section modulus of a beam. Ideal beam cross-section. 4.9 Deflection of beams and shafts. Slope and deflection. Mohr's Theorems. 4.10 Hyperstatic bending.
5. Other forces: shear, buckling and torsion	5.1. Shear in joints. Definition. Shear force. Shear stress. Bolted and riveted joints. Shear joints. 5.2. Introduction to the concept of compressive buckling. 5.3. Intoduction to the concept of torsion in straight prisms.

Planning	Class hours	Hours outside the classroom	Total hours
Lecturing	32.5	49	81.5
Laboratory practices	9	23	32
Problem based learning	9	24.5	33.5
Essay questions exam	3	0	3
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	Description
Lecturing	Lecture where theoretical principles are presented using digital media, videos and blackboard.
Laboratory practices	Activities of application of the knowledge to concrete situations and of acquisition of basic skills and procedural skills related with the subject of study.
Problem based learning	Resolution of problems related to real case studies.

Personalized attention	
Methodologies	**Description**
Laboratory practices	

Assessment	Description	Qualification	Training and Learning Results
Laboratory practices	A) it will evaluate the attendance and active participation in all the practicals of the semester, as well as the correct delivery (time and form) of all the documentation requested (reports, exercises, etc.). Practical sessions will be held in a fixed date, so it is not possible to attend the practical in a later date. Whether the student does not attend to a practical, he/she must demonstrate that the absence was due to unavoidable reasons (e.g. medical reasons). Practicals will marked with the value indicated, only when the student reaches the minimum mark in the written exam, which is 45%. (See following section: 'Other comments')	2.5	B3 C14 D1 B4 D2 D9 D10 D16 D17

Problem based learning	C) Written tests to evaluate the individual work delivered by the student. It will be compulsory the attendance to the 90% of the practicals to obtain the marks given in section C. The marks obtained in the sections A will proportionally affect to the marks of the section C. The section C will be marked with a maximum value of 12,5% of the total mark, only when the student reach the minimum mark in the written exam, which is 45%. (See following section: 'Other comments')	12.5	B3 B4	C14	D1 D2 D9 D10 D16
Essay questions exam	Written exam in the dates established by the School.	85	B3 B4	C14	D1 D2 D9 D10 D16

Other comments on the Evaluation

Students resigning continuum assessment (after School aproval) will be evaluated only through the written exam which will be graded with 100% of final mark.

Continuum assessment is composed of sections A and C. The maximum mark for continuum assessment (NEC) is 15%, which will be computed from the following equation: NEC (%) = 0,25·(A) + 1,25·(C)·(A) ; where A and C are granted 0-1.

Ethical commitment: it is expected an adequate ethical behavior of the student. In case of detecting unethical behaviour (copying, plagiarism, unauthorized use of electronic devices, etc.) shall be deemed that the student does not meet the requirements for passing the subject.

In this case, the overall rating in the current academic year will be Fail (0.0).

The use of any electronic device for the assessment tests is not allowed unless explicitly authorized. The fact of introducing unauthorized electronic device in the examination room will be considered reason for not passing the subject in the current academic year and will hold overall rating (0.0).

Sources of information

Basic Bibliography

Hibbeler, R., **Mechanics of Materials**,

Manuel Vázquez, **Resistencia de materiales**,

Complementary Bibliography

Ortiz Berrocal, L., **Resistencia de materiales**, Ed. McGraw-Hill,

González Taboada, J.A., **Tensiones y deformaciones en materiales elásticos**, Ed. Autor,

González Taboada, J.A., **Fundamentos y problemas de tensiones y deformaciones en materiales elásticos**, Ed. Autor,

Recommendations

Other comments

Requirements: To register for this module the student must have passed or be registered for all the modules of the previous year.