SUBJECT TEACHING GUIDE

G624 - Material Resistance

Degree in Mining Resources Engineering
First Degree in Mining Resources Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Mining Resources Engineering First Degree in Mining Resources Engineering			Type and Year	Compulsory. Year 2 Compulsory. Year 3
Faculty	School of Mines and Energy Engineering				
Discipline	Subject Area: Mining Pre-Technology Module: Training in Common with the Mining Branch				
Course unit title and code	G624 - Material Resistance				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. TRANSPORTES Y TECNOLOGIA DE PROYECTOS Y PROCESOS
Name of lecturer	NOEMI BARRAL RAMON
E-mail	noemi.barral@unican.es
Office	E.P. de Ingeniería de Minas y Energía. Planta: + 2. DESPACHO (233)
Other lecturers	LUIS VEJO FERNANDEZ

3.1 LEARNING OUTCOMES

- Once the course has been passed, students will have obtained
  Acquisition of knowledge main in field of estructural calculation
  Develop the ability to analyze, distinguish and solve a particular technical problem related to the discipline, simple and logical way by applying fundamental principles and tenets of the conforming own theories of Strength of Materials.

4. OBJECTIVES

The objectives of the subject is focuses
Acquisition of knowledge main in field of estructural calculation
Develop the ability to analyze, distinguish and solve a particular technical problem related to the discipline, simple and logical way by applying fundamental principles and tenets of the conforming own theories of Strength of Materials.

6. SUBJECT PROGRAM	
	CONTENTS
1	Main objectives and hypothesis aplicated in material resistence Objectives of the material resistence Main hypothesis Main concepts. Stress, beam, unions, isostatism and hiperestatism. Main types of cargo Elements to reduce acting Forces. Bending moment Axil force Shear strength Properties of materials. Body elastic Hooke Law Stress-strain curves
2	EFFORTS (axial, shear) AND MOMENTS (BENDING, TORQUE) • Traction and simple compression. Prismatic bar subjected to a constant normal stress. Narvier hypothesis. Maximum admissible stress. Lateral contraction. Poisson's ratio. Traction-Compression in two or three orthogonal directions. • Flexion. Bending Pure, Simple bending, bending flat. Modulus (resistor module). Geometric performance. Influence of the shape of the cross section. Biaxial bending. Deformation. Composed bending. Influence of the section. • Shear strength. Influence of sections • torsional moment. Concept. Definition of torque. Effects of torque. Shear stresses caused by torsion. Torsion in hollow circular cylinders. • Shear strength. Influence of sections • torsional moment. Concept. Definition of torque. Effects of torque. Shear stresses caused by torsion. Torsion in hollow circular cylinders.

3	Deformations. • deformations in beams subjected to bending. • Differential equation of the elastic line. • Calculation of elastic line for double integration. • Method moment diagram area. • Mohr diagrams. • Job strain. • Application to hyperstatic beams.
4	APPLICATION TO COMPLEX grid. Supports and columns. Porches. Static plot.
5	1. EFFORTS (axial, shear) AND MOMENTS (BENDING, TORQUE) 2.Deformations 3.APPLICATION TO COMPLEX grid.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam	Written exam	Yes	Yes	60,00
Test/ exam	Written exam	No	Yes	20,00
work	Work	No	Yes	20,00
TOTAL				100,00

Observations

The final exam will be divided into parts corresponding to theory and exercises, being necessary to obtain a minimum grade in each part independently to pass the exam.
necessary to obtain a minimum grade in each of these parts independently to pass the exam (4.0/10 in each of them).
(4.0/10 in each of them). In case of not passing the minimum grades in any of the parts, the final grade will be determined from the
final grade will be determined from the average obtained by weighing the different evaluation activities , up to a maximum limit for the final grade of the exam.
maximum limit for the final grade of the course of 4.9. The parts passed will be kept for the extraordinary call.
extraordinary exam.

Observations for part-time students

Part-time students will be evaluated according to the Regulations of the University of Cantabria. To this end, is them will enable the realization of the partial the same day of the final exam.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

“Resistencia de materiales”. Stephen Timoshenko. 1982.
“Resistencia de materiales”. William A. Nash. 1991.
“Estática gráfica”. Otto Henkel. Por Joaquín Gay y Kurt Fizia. 1959.
"E.A.E. Instrucción del acero estructural". Gobierno de España. Ministerio de Fomento. 2012. Recurso electrónico:
http://www.fomento.gob.es/NR/rdonlyres/029BEBA6-A895-40E4-BA9F-FD0D75E3B865/107241/5EHE2008ultimo.pdf

Apuntes proporcionados por los profesores. Disponibles en el OpenCourseWare para descarga en:
http://ocw.unican.es/ensenanzas-tecnicas/resistencia-de-materiales