

School of Mines and Energy Engineering

SUBJECT TEACHING GUIDE

G625 - Theory and Analysis of Structures

Degree in Mining Resources Engineering

Academic year 2023-2024

| 1. IDENTIFYING DATA | | | | | | | |
|----------------------------------|--|------------------|-----|--------------------|--------------------|--------------|--|
| Degree | Degree in Mining Resources Engineering | | | Type and Year | 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 | G625 - Theory and Analysis of Structures | | | | | | |
| Number of ECTS credits allocated | 6 | Term | | Semester based (2) | | | |
| Web | | | | | | | |
| Language of instruction | Spanish | English Friendly | Yes | Mode of o | delivery | Face-to-face | |

| Department | DPTO. TRANSPORTES Y TECNOLOGIA DE PROYECTOS Y PROCESOS | |
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| Name of lecturer | NOEMI BARRAL RAMON | |
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3.1 LEARNING OUTCOMES

- Once the course has been passed, students will have achieved:

Acquire a set of basic knowledge in the field of construction.

Analyze, discuss and properly solve a particular problem relating to the use of concrete with practical criteria.

Solve calculation and design elements, being able to check the capacity.

4. OBJECTIVES

The objectives of the course are focused on the acquisition of basic knowledge in the field of construction, the promotion of student's skills to analyze, discuss and solve a particular problem related to the use of concrete, with practical criteria, and the calculation and design of elements, checking their expected performance.



| 6. COURSE ORGANIZATION | | | | |
|------------------------|---|--|--|--|
| CONTENTS | | | | |
| 1 | CONTENTS PART I: THE CONCRETE. Concrete components. Features concrete. Properties of concrete, fresh and hardened Retraction. Influence of temperature. Durability. Concrete dosage. General. Water-cement ratio. Particle size distribution of the aggregate. Consistency. Mixture proportions. Corrections and essays. Laying works Transport. Concreting in adverse weather conditions. Discharge and placement. Compacting and curing. Concrete joints. Armor. Geometric and mechanical characteristics. | | | |
| 2 | Welding of steels. BLOCK II: CALCULATION OF SECTIONS. Section calculations by using the classic method. Basic assumptions. Allowable stresses. Simple and combined bending. Simple and compound traction and compression. Biaxial bending. Section calculations by the Calculation Method at break. Foundation. Domains deformation. Equilibrium equations and compatibility. Calculation of rectangular sections by him parabola-box diagram. Sections for simplified calculation methods. Method rectangular diagram. It simplified method stop time. Rectangular sections. | | | |



| 3 | PART III: APPLICATION TO FOUNDATION AND WALLS |
|---|--|
| | Foundations. Dimensioning as reinforced concrete structures. |
| | Types of shoes |
| | Isolated and continuous low wall footings. Predimensioning and armor. |
| | Stresses transmitted to ground. |
| | Foundation slabs. |
| | Piles, types and pilot systems. Analysis and design of pile caps. |
| | Industrial flooring. |
| | Retaining walls. |
| | Dimensioning as reinforced concrete structure. |
| | Typology. |
| | Bracket walls. Pre-dimensioning and calculation as concrete structure. |
| | Derricks and pylons. |
| 4 | SECTION IV: earthmoving equipment associated with the execution of structures: |
| | Excavation, transport and compaction machines. |

| 7. ASSESSMENT METHODS AND CRITERIA | | | | | | |
|---|--------------|-----|-----------|-------|--|--|
| Description | п Туре | | 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 the two main parts belonging to theory and exercices. It is necessary to pass both individual parts in order to get through the whole subject. Students who do not pass the continuous assessment during the course may choose to recover it in the extraordinary exam in the same format in which it was carried out throughout the course. | | | | | | |

Observations for part-time students

Part-time students will be evaluated according to the Regulations of the University of Cantabria. They have the option of performing the partial exams the day of the final exam.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

"EAE. Instrucción del acero estructural". Gobierno de España. Ministerio de Fomento. 2012. Recurso electrónico:

http://www.fomento.gob.es/NR/rdonlyres/DB0980EB-1915-4175-8EBA-A77B93052A33/109486/OKLibro_Acero_EAE.pdf

"EHE-08. Instrucción del hormigón estructural". Gobierno de España. Ministerio de Fomento. 2011. Recurso electrónico:

http://www.fomento.gob.es/NR/rdonlyres/029BEBA6-A895-40E4-BA9F-FD0D75E3B865/107241/5EHE2008ultimo.pdf

"Ciencia de la construcción". Odone Belluzi. Versión de Manuel Velázquez Velázquez. 1967.

"Cálculo de estructuras de cimentación". J. Calavera. 2000.

"Muros de contención y muros de sótano". J. Calavera. 2001.

"Hormigón armado". Pedro Jiménez Montoya. 2000.

"Hormigón armado". Alfredo Paez. 1986.

"Tratado de construcción: lo que debe saber el proyectista". Enrique Rodón. 1978.

Apuntes proporcionados por los profesores.

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