# SUBJECT TEACHING GUIDE

## G600 - Explosives Technology

## Degree in Energy Resources Engineering

Academic year 2019-2020

| 1. IDENTIFYING DATA | | | | | |
|---|---|---|---|---|---|
| Degree | Degree in Energy Resources Engineering | | | Type and Year | Compulsory. Year 4 |
| Faculty | | | | | |
| Discipline | Subject Area: Technology of Mineral and Energy Resources<br>Module: Training in Energy Resources, Fuels and Explosives | | | | |
| Course unit title and code | G600 - Explosives Technology | | | | |
| 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 | RUBEN PEREZ ALVAREZ |
| E-mail | ruben.perez@unican.es |
| Office | E.P. de Ingeniería de Minas y Energía. Planta: + 2. DESPACHO (232) |
| Other lecturers | |

## 3.1 LEARNING OUTCOMES

- Had the subject been passed, the student will have specific knowledge about explosives and pyrotechnic elements, their physical and chemical properties, manufacturing, transport, Law and safety aspects.

## 4. OBJECTIVES

The main objective of this subject is the analysis of the main characteristics of industrial explosives and pyrotechnical elements, their production, selection, supply and use. Legal and safety aspects are also considered.

## 6. COURSE ORGANIZATION

| | CONTENTS |
|---|---|
| 1 | EXPLOSIVES. TYPES, CHARACTERISTICS AND MANUFACTURING.<br>History of Explosives.<br>Types of Explosives.<br>Industrial explosives. Characteristics and manufacturing.<br>Selection. |
| 2 | FIRING SYSTEMS.<br>Electric blasting.<br>Non-electric blasting.<br>Electronic blasting. |
| 3 | ROCK BREAKAGE AND BLAST CALCULATIONS<br>Bench blasting.<br>Contour blasting.<br>Underground blasting.<br>Other special types. |
| 4 | UNDESIRED EFFECTS AND MITIGATION.<br>Projections.<br>Vibrations and aerial waves. |
| 5 | LEGAL AND SAFETY ASPECTS TO CONSIDER<br>Legal framework.<br>Storage and transport.<br>Destruction of explosives. |

## 7. ASSESSMENT METHODS AND CRITERIA

| Description | Type | Final Eval. | Reassessn | % |
|---|---|---|---|---|
| Written exam | Written exam | Yes | Yes | 60,00 |
| Test | Written exam | No | No | 10,00 |
| Resolution of Practical Cases | Written exam | No | No | 20,00 |
| Teamwork Essay | Work | No | No | 10,00 |
| TOTAL | | | | 100,00 |

**Observations**

The final exam will be divided in theory and practice (50% of the total score for each part). The student must obtain a minimal score of 4.5/10 on each. If these requirements are not satisfied, the final score will be obtained as the weighted average of the different items of evaluation, until a maximum of 4.9. Any passed item would be kept for the extraordinary evaluation.

**Observations for part-time students**

Part-time students will be evaluated following the considerations established in the Normative of the University of Cantabria. They will be given the chance to develop the teamwork essay as an individual one (10%), and to take a test (10% of the final score) and an exercise (20% of the final score) on the same date of the final exam, or on a date to be agreed between the student and the Professor, according to their availability.

| 8. BIBLIOGRAPHY AND TEACHING MATERIALS |
| --- |
| BASIC |
| Curso de Tecnología de Explosivos. Autores: J.A. Sanchidrián, E. Muñiz. Fundación Gómez Pardo, D.L. 2000.<br>Manual de empleo de explosivos. U.E.E., 2000. |
| Apuntes proporcionados por los profesores. |