

### COURSE NAME

Name: **POWER PLANTS AND ELECTRICAL LINES**

Code: 101213

Curriculum: **DEGREE IN ENERGY ENGINEERING AND MINERAL RESOURCES**

Year: 4

Subject: POWER PLANTS AND ELECTRICAL LINES

Nature: OBRIGATORY Duration: FIRST SEMESTER

ECTS Credits: 9

Classroom hours: 90

Face-to-face classroom percentage: 40%

Non-contact hours: 135

### FACULTY DETAILS

Name: CANTIZANI OLIVA, JUAN (Coordinator)

Department: ELECTRICAL AND AUTOMATION ENGINEERING

Area: Electrical Engineering

Location of the office: EPS Belmez. Old building. (3st Floor)

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### SKILLS

- CB1 Have and understand specific knowledge of the field of study of mining engineering.
- CB2 Have and understand current and cutting-edge knowledge of the field of mining engineering.
- CB3 Be able to apply the knowledge acquired in professional contexts and to elaborate and defend arguments in the field of knowledge of mining engineering.
- CB4 Solve problems within the study area of Mining Engineering.
- CB5 Gather and interpret relevant data within the study area of mining engineering in order to make judgments that include reflection on social, scientific or ethical issues.
- CB6 Transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.
- CB7 Possess the learning skills necessary to undertake studies with a high degree of autonomy
- CU2 Know and refine the user level of ITs.
- CERE1B Transformation and management of energy products.
- CERE3 Electricity and thermal energy generation, transport, transformation and management industries.
- CERE7 Logistics and energy distribution.
- CERE10 Quality control of the materials used.

### OBJECTIVES

Knowledge of the different ways of producing and distributing electrical energy. Main components of the different production methods. Knowledge of the electrical sector.

### CONTENTS:

#### 1. Theoretical contents

##### 1. INTRODUCTION

- 1.1 Historical Review
- 1.2 Demands of the electrical system.
- 1.3 Regulations and Terminology.
- 1.4 Sustainable electrical energy.
- 1.5 Types of Power Plants.

## 2. POWER PLANTS AND ELECTRICITY PRODUCTION

### 2.1. Power Plants.

2.1.1 Fossil Fuel Power Plant.

2.1.2 Combined Cycle Power Plant.

2.1.3. Nuclear Power Plant.

2.1.4 Renewable Fuel Power Plant.

2.1.5 Fuel-less Power Plant (Geothermal, Solar Thermal, Hydrothermal).

### 2.2 Atmospheric Power Plants.

2.2.1 Hydroelectric Plants.

2.2.2 Wind

2.2.3 Tidal power

### 2.3 Solar Power Plants.

## 3. COMPONENTS OF THE DIFFERENT PRODUCTION METHODS

3.1 Electric machines

3.2 Synchronous generators

3.3 Asynchronous generators

3.4 Photovoltaic generators

3.5 Power transformers

3.6 Auxiliary elements of a power plant

## 4. TRANSPORT AND DISTRIBUTION FACILITIES

4.1 Substations

4.2 Overhead lines

4.3 Underground lines

4.4 Transformer Substations

## 5. ELECTRICITY SECTOR

5.1 Evolution of the Electricity Sector

5.2 Operation of the electrical system. The Agents.

5.3 Regulatory bodies

### 2. Practical contents.

Electrical Standards.

Testing and Measurement Equipment for Electrical Installations

Software for electrical installations

Analysis of companies in the electricity sector.

3 Technical Visits conducted to power generation plants.