

## SUBJECT TEACHING GUIDE

### G871 - Electrical Generation

### Degree in Electrical Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Electrical Engineering			Type and Year	Compulsory. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Energy Generation, Transport and Distribution. Module: Electrical Technology				
Course unit title and code	G871 - Electrical Generation				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA				
Name of lecturer	CRISTIAN OLMO SALAS				
E-mail	cristian.olmo@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO (S3067)				
Other lecturers					

3.1 LEARNING OUTCOMES	
- Architectures.	Knowledge of power generation systems.
- Design of power plants.	
- Knowledge of the coordination of power generation systems in Spain and other countries of the European Union.	

#### 4. OBJECTIVES

The student have to acquire the basic knowledge to design of power plants, both conventional and renewable energy, energy efficiency and consumption.

The student have to acquire the basic knowledge to design and economic viability of power generation systems, microsystems, self-generation systems.

The student have to acquire the basic knowledge of the coordination of the electrical generation system in Spain and other countries of the European Union.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	CONVENTIONAL AND RENEWABLE GENERATION.
1.1	Electric energy and electric generation
1.2	Electric system: electric production and generation
1.3	Electrical system: transport and distribution of electrical energy.
1.4	Electrical system: electrical energy consumption.
1.5	Parameters and relative aspects of electricity generation.
1.6	Economic and technical analysis.
1.7	Legislation and future perspectives.
2	ELECTRICITY MARKETS.
2.1	Electricity market.
2.2	Electricity market agents.
2.3	Wholesale market.
2.4	Retail market.
2.5	Electricity supply costs.
3	ELECTRICAL GENERATION MACHINES.
3.1	Hydroelectric power plant machines.
3.2	Thermal power plant machines.
3.3	Wind power plant machines.
4	ELECTRICAL SUBSTATIONS.
4.1	Facility classification.
4.2	Elements of an electrical substation.
4.3	Types/design of electrical substations.
4.4	Coordination and operation of an electrical substation.
4.5	Events during interruption and interruption technologies.
4.6	Operator safety at work in the substation.
4.7	Technical safety of the substation and power plants.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Continuous assessment in class	Work	No	No	10,00
Continuous evaluation - Partial exam 1	Written exam	No	Yes	45,00
Continuous evaluation - Partial exam 2	Written exam	No	Yes	45,00
Ordinary call	Written exam	Yes	Yes	0,00
Extraordinary call	Written exam	Yes	No	0,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>The course is divided into two parts:</p> <ul style="list-style-type: none"> <li>• Part 1: Item 1.</li> <li>• Part 2: Items 2, 3 and 4.</li> </ul> <p>The Final Mark of the subject is calculated by this expression:  <math>45\% P1 + 45\% P2 + 10\% CAP</math></p> <p>P1 is the score obtained for the 1st part of the course in the first partial exam.                      P2 is the score obtained for the 2nd part of the course in the second partial exam.                      CAP is the score obtained during the continuous assessment in class and practices during classes .</p> <p>During the course there will be two partial exams, each corresponding to one of the two parts into which the subject is divided.                      Likewise, in each official call, the exam will be divided into two parts, P1 and P2.</p> <p>To pass the course have to obtain a final score equal to or greater than 5 (out of 10) and get none of the P1 and P2 notes of both parts of the subject is less than 4 (out of 10). If these conditions are not met, the Final Mark of the subject will be the lower value between 4.9 and the value obtained from the previous expression.</p> <p>Those students that have not passed the subject after the continuous evaluation and the partial exams, but have obtained an equal or higher than 4 (out of 10) in one of the parts need not be examined in this part in the ordinary or extraordinary meeting of the Final Review.</p> <p>Those students following the ordinary call of the Final Exam that have not passed the subject, but have obtained an equal or higher than 4 (out of 10) in one of the parts need not be examined in this part in the ordinary or extraordinary meeting of the Final Review.</p> <p>The marks equal to or greater than 4.0 for each of the parts of the subject are kept until the ordinary and extraordinary call for the Final Exam of the current course, but not for the following courses.</p> <p>In connection with the resolutions adopted at the regular meeting of the School Board held on June 10, 2010, it states that, with respect to evaluation activities having the character of recoverable.</p> <ul style="list-style-type: none"> <li>• As a general and except criterion in this guide specify a different thing , a student may be submitted only to the recovery of those activities there not passed, that is, where there has obtained a minimum score of five (5) on ten (10).</li> <li>• As a general and except criterion in this guide a different thing specified in the recovery period the assessment procedure of an activity shall be the same as the activity that originates.</li> </ul> <p>Mark: According to the Royal Decree RD 1125/2003 on the European credit system and the grading system in official university qualifications and valid throughout the national territory, the results obtained by the student in each of the subjects of the plan studies were graded according to the following numerical scale from 0 to 10, with one decimal, which may be added corresponding qualitative rating:</p> <p>0.0 to 4.9: Suspense (SS).                      5.0 to 6.9: Approved (AP).                      7.0 to 8.9: Notable (NT).                      9.0 to 10: Outstanding (SB).</p> <p>Mid-term exam approved not saved for the following courses.</p>				
<b>Observations for part-time students</b>				
Part-time students have the same evaluation conditions without assistance attendance to classes.				

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

## BASIC

Madrazo Maza, Alfredo y Balbás García, Francisco Javier. "Centrales Eléctricas I"

Madrazo Maza, Alfredo y Balbás García, Francisco Javier. "Subestaciones Eléctricas II (Práctica: Protección ante descargas atmosféricas)"

Sanz Feito, J. "Centrales eléctricas".

CEAC. "Centrales eléctricas. Enciclopedia CEAC de la electricidad".

GUIONES DE CLASE preparados por los profesores de la asignatura.

Moro, M. "Instalaciones domóticas", ISBN: 978-84-9732-858-6

BALBÁS GARCÍA, F. J. "Sistema Energético Español. Coste de la Energía Eléctrica y posibles escenarios". Editorial Universidad de Cantabria.