

SUBJECT TEACHING GUIDE

G1179 - Energy and Electrical Technology

Degree in Civil Engineering

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Optional. Year 4
Faculty	School of civil Engineering				
Discipline	Optional Subjects: Open to all Itineraries				
Course unit title and code	G1179 - Energy and Electrical Technology				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web	https://aulavirtual.unican.es/				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA				
Name of lecturer	JOSE RAMON ARANDA SIERRA				
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Other lecturers	FRANCISCO JAVIER BALBAS GARCIA				

3.1 LEARNING OUTCOMES
- Knowledge of electricity tariffs.
- Ability to perform feasibility studies of energy.
- Calculation using software electrical installations civil engineering.
- Making energy certificates.
- Basic knowledge with PLCs, regulation, control and communications in civil engineering.

4. OBJECTIVES

With this course the student will learn the configuration of the energy sector of Spain, and electricity tariffs.
You will learn the basics of energy efficiency, energy certification and energy feasibility studies.
The student will be formed in the use of automation systems for regulation, control and communications in civil engineering.

6. COURSE ORGANIZATION

CONTENTS	
1	ENERGY SECTOR.
1.1	Spanish energy system characteristics. Breakdown and analysis of the cost of energy.
1.2	Electricity rates. Electricity bill.
1.3	Development of an Electrical Installation (power and lighting) in BIM system
1.4	Economic viability of a power plant
2	ENERGY EFFICIENCY
2.1	Transmittance (Closures and hollow, internal and external improvements)
2.2	Lighting (Technologies, classifications and implementation)
2.3	Home automation. Automation and low-cost architectures Regulation and control.
2.4	Energy certificate: • Legislation. • CE3X Program.
3	APPLIED AUTOMATION IN CIVIL ENGINEERING.
3.1	Automation with wired logic
3.2	Automation with programmed logic.
3.3	Applications in civil engineering. Building automation systems. Urbotic systems. Smart cities.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Activities Block 1	Others	Yes	Yes	30,00
Activities Block 2	Others	Yes	Yes	30,00
Activities Block 3	Others	Yes	Yes	30,00
Exhibition of works	Others	Yes	Yes	10,00
TOTAL				100,00

Observations

Partial passes are not saved for subsequent courses.

The exams will consist of a series of theoretical-practical questions that allow to evaluate the syllabus of the subject.

The final grade of the student will be by continuous evaluation and as a result of the expression:

$$CF = 0.30 \times AB1 + 0.30 \times AB2 + 0.30 \times AB3 + 0.10 \times ET$$

where

CF is the final grade,

AB1, AB2, AB3 are the ratings of the block activities, and

ET is the qualification of the exhibition of the works.

All grades will be values ??from 0 to 10.

To pass the course, you must obtain a Final Grade of the Subject equal to or greater than 5 (out of 10).

Once the result of the continuous assessment has been published, the students who fail for the continuous assessment or who want to improve their grade, will be commissioned with an individualized final project (CT). Said work will be qualified preferably by the public presentation and oral defense of the same by the student, obtaining the improved final grade (CFM):

$$CFM = 0.60 \times CF + 0.40 \times CT.$$

All grades will be values ??from 0 to 10.

In relation to the agreements adopted in the ordinary session of the School Board held on June 10, 2010, it is established that, with respect to the evaluation activities that are recoverable,

- As a general criterion and unless something different is specified in this guide , a student may only appear for recovery of those activities that have not been passed, that is, in which they have not obtained a minimum grade of five out of ten.

- As a general criterion and unless something different is specified in this guide , in the recovery period the evaluation procedure of an activity will be the same as that of the activity that originates it.

Note: According to Royal Decree RD 1125/2003 on the European credit system and the grading system in official university degrees and valid throughout the national territory, the results obtained by the student in each of the subjects of the plan Studies will be graded according to the following numerical scale from 0 to 10, with an expression of one decimal place, to which their corresponding qualitative score may be added:

0.0-4.9: Suspense (SS).

5.0-6.9: Pass (AP).

7.0-8.9: Notable (NT).

9.0-10: Excellent (SB).

Students who, having passed the continuous assessment and submit the additional voluntary work, obtain the grade of outstanding may be assigned the grade of Honor Roll, within the limits of university regulations.

NOTE: Faced with the uncertain situation that the social distancing measures established by the health authorities do not allow the evaluation to be carried out in person in the classroom, the remote evaluation will be adopted.

Observations for part-time students

Part-time students will have the same conditions as the other students.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

GUIONES DE CLASE preparados por los profesores de la asignatura

MADRAZO MAZA, A. y BALBÁS GARCÍA, J. "Centrales eléctricas I", ISBN: 978-84-693-3339-6

CARTA GONZÁLEZ, J. A., "Centrales de energías renovables, generación eléctrica con energías renovables", et al., ISBN: 978-84-832-2997-2

CAPDEVILLA, I., et al., "Eficiencia energética en la rehabilitación de edificios", (ITT), ISBN: 978-84-616-1379-3

GÓMEZ EXPÓSITO, A. et al. (2002); "Análisis y operación de sistemas de energía eléctrica", McGraw-Hill.

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