

## SUBJECT TEACHING GUIDE

### G710 - Further Electronics

#### Degree in Industrial Technologies Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Industrial Technologies Engineering			Type and Year	Compulsory. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Further Electronics and Automation Module: Selection of Specific Technologies				
Course unit title and code	G710 - Further Electronics				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA				
Name of lecturer	ROSARIO CASANUEVA ARPIDE				
E-mail	rosario.casanueva@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO PROFESOR (S3085)				
Other lecturers	VICTOR MANUEL FERNANDEZ SOLORZANO				

3.1 LEARNING OUTCOMES
- Analyze and design combinational and sequential digital circuits.
- Know and identify the most characteristic converters and most widespread applications of Power Electronics.
- Ability to design, conduct experiments and analyze results.

**4. OBJECTIVES**

- Ability to apply basic concepts of digital electronics to solve practical problems and work independently.
- Capacity for analysis and synthesis of combinational and sequential circuits.
- To provide students with knowledge of the principles of power conversion techniques.
- To provide students with the basics that allow the steady-state converter analysis, specify and undertake basic designs of power electronic converters in continuous conduction mode.
- Ability to operate laboratory equipment and analyze and interpret results.

**6. SUBJECT PROGRAM**

**CONTENTS**

1	<p>Part 1: Digital Electronics</p> <p>Introduction: Number systems, Boolean algebra, logic gates</p> <p>Combinational Logic Design: Minimization, implementation and MSI combinational circuits</p> <p>Sequential Logic Design: Latches, analysis and design of synchronous sequential circuits</p> <p>Introduction to Programmable Logic Devices: CMOS digital circuits, PLDs and FPGAs</p> <p>Analog-digital conversion: basic concepts.</p>
2	<p>Part 2: Power Electronics</p> <p>Principles of power electronic conversion:</p> <ul style="list-style-type: none"> <li>- Introduction to power processing. Applications of power electronics.</li> <li>- Principles of steady-state converter analysis</li> <li>- Steady-state equivalent circuit modeling, losses, and efficiency</li> </ul> <p>Converter Circuits:</p> <ul style="list-style-type: none"> <li>- Circuit manipulations. List of converters. Transformer isolation. Isolated converters.</li> </ul>

**7. ASSESSMENT METHODS AND CRITERIA**

Description	Type	Final Eval.	Reassessn	%
Final exam	Written exam	Yes	Yes	40,00
Continuous assessment	Others	No	Yes	30,00
Laboratory practice	Laboratory evaluation	No	Yes	30,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>The completion of voluntary activities proposed by the teacher throughout the course, as well as active participation in theory classes will be valued with up to 1 point of the overall grade.</p> <p>Continuous assessment may be recovered in the extraordinary exam by adding its corresponding percentage to the percentage of the final exam.</p>				
<b>Observations for part-time students</b>				
<p>If the student can not participate in the activities of continuous assessment, the corresponding percentage is added to the percentage of the final exam.</p>				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Floyd, T. L. 2016. Fundamentos de sistemas digitales. Madrid: Pearson Educación. ISBN: 9788490353011.

- Erickson, R. W.; Maksimovic, D. 2001. Fundamentals of Power Electronics. 2nd Ed. Kluwer Academic Publisher. ISBN: 0972372700.

Libro electrónico:

<https://link.springer.com/book/10.1007/978-3-030-43881-4>