

## SUBJECT TEACHING GUIDE

### G1000 - Power Electronics

#### Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2023-2024

| 1. IDENTIFYING DATA              |   |                  |                    |                  |                    |
|----------------------------------|---|------------------|--------------------|------------------|--------------------|
| Degree                           | Degree in Industrial Electronic Engineering and Automatic Control Systems |                  |                    | Type and Year    | Compulsory. Year 3 |
| Faculty                          | School of Industrial Engineering and Telecommunications                   |                  |                    |                  |                    |
| Discipline                       | Subject Area: Industrial Electronics<br>Module: Specific Technology       |                  |                    |                  |                    |
| Course unit title and code       | G1000 - Power Electronics   |                  |                    |                  |                    |
| 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. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA                                |  |  |  |  |
| Name of lecturer | FRANCISCO JAVIER DIAZ RODRIGUEZ   |  |  |  |  |
| E-mail           | javier.diaz@unican.es   |  |  |  |  |
| Office           | E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO PROFESORES (S3083) |  |  |  |  |
| Other lecturers  | CHRISTIAN BRAÑAS REYES  |  |  |  |  |

### 3.1 LEARNING OUTCOMES

- The objective of the course is providing to the students with knowledge of high efficiency electrical energy conversion techniques with PWM control.
- Power electronic devices and magnetic components design.
- Converters in equilibrium and Converter dynamics and control

### 4. OBJECTIVES

Achieve the learning outcomes of the course

| 6. COURSE ORGANIZATION |                                |
|------------------------|--------------------------------|
| CONTENTS               |                                |
| 1                      | Introduction                   |
| 2                      | Converters in equilibrium      |
| 3                      | Converter dynamics and control |
| 4                      | Magnetics                      |

| 7. ASSESSMENT METHODS AND CRITERIA  |                       |             |           |        |
|---|-----------------------|-------------|-----------|--------|
| Description   | Type                  | Final Eval. | Reassessn | %      |
| Laboratory Evaluation   | Laboratory evaluation | Yes         | Yes       | 40,00  |
| continuous assessment   | Work                  | Yes         | Yes       | 10,00  |
| final exam  | Written exam          | Yes         | Yes       | 50,00  |
| TOTAL   |                       |             |           | 100,00 |
| Observations  |                       |             |           |        |
| <p>To pass the course, the student must to approve the final exam and laboratory evaluation separately. In the case that the health criteria make it necessary, the evaluation tests will be carried out following the mixed teaching format: classroom and non-classroom classes. In the most extreme case that students and teachers cannot go to the classroom, the assessment tests will be carried out using telematic tools. In these cases, the content of the tests, being similar to the face-to-face case, would be totally or partially individualized for each student.</p> |                       |             |           |        |
| Observations for part-time students   |                       |             |           |        |
| <p>When obtaining a 50% evaluation with evaluation activities integrated into the teaching (continuous evaluation and laboratory) the evaluation criteria are the same for all students. Part-time students with incompatibility of schedule receive direct personal attention or by telematic tools on the contents and continuous assessment. The virtual classroom facilitates access to information and continuous assessment tests.</p>  |                       |             |           |        |

| 8. BIBLIOGRAPHY AND TEACHING MATERIALS  |
|---|
| BASIC   |
| <p>Autor: Robert W. Ericsson, Dragan Maksimovic<br/>                     Título: Fundamentals of Power Electronics (2a Ed.)<br/>                     Editorial: Kluwer Academic Publisher Group, 2001<br/>                     Comentarios: Es el libro que se sigue durante el curso. Ofrece un enfoque moderno de la Electrónica de Potencia. El libro se organiza en 20 capítulos donde se analizan en detalle los convertidores así como su modelado y control. El diseño de los elementos magnéticos es tratado con amplitud. Contiene a su vez numerosos ejercicios y ejemplos resueltos.</p> <p>Autor: A. Barrado, A. Lázaro<br/>                     Título: Problemas de Electrónica de Potencia<br/>                     Editorial: Pearson Prentice Hall. 2007<br/>                     Comentarios: Es un libro recopilatorio de problemas de Electrónica de Potencia que han realizado varios profesores de universidades españolas.</p> |

