

## SUBJECT TEACHING GUIDE

### G1004 - Industrial Automation and Robotics

#### 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: Automation and Systems Control<br>Module: Specific Technology |                  |                    |                  |                    |
| Course unit title and code       | G1004 - Industrial Automation and Robotics                                  |                  |                    |                  |                    |
| 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. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA                              |  |  |  |  |
| Name of lecturer | ESTHER GONZALEZ SARABIA   |  |  |  |  |
| E-mail           | esther.gonzalezs@unican.es  |  |  |  |  |
| Office           | E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO PROFESOR (S2021) |  |  |  |  |
| Other lecturers  | ELENA HOYOS VILLANUEVA  |  |  |  |  |

### 3.1 LEARNING OUTCOMES

- Ability to work with PLCs at the level of design of logical automations and at the level of regulation and control.
- Ability to design SCADA systems.
- Knowledge of general characteristics and applications of industrial robots

#### 4. OBJECTIVES

Knowledge of the different ways of performing logical automation  
 Use of the PLC in process control.  
 Knowledge of the PLC architecture.  
 Knowledge of the SCADA systems  
 Knowledge of structures and general characteristics of industrial robots and the world robot market.  
 Knowledge of robotic applications and implementation criteria.  
 Knowledge of the different types of robot programming languages .

#### 6. COURSE ORGANIZATION

##### CONTENTS

|   |  |
|---|--|
| 1 | Programmable logic controllers (PLCs). General concepts. Design and programming of logic functions.                  |
| 2 | Advanced programming. PLC-based process control. PLCs Architecture.  |
| 3 | Supervisory control. SCADA systems.  |
| 4 | Industrial robotics. Introduction. Structures and general characteristics of industrial robots. Robots world market. |
| 5 | Implementation and application of robots.<br>Robot programming.  |

#### 7. ASSESSMENT METHODS AND CRITERIA

| Description  | Type                  | Final Eval. | Reassessn | %      |
|--|-----------------------|-------------|-----------|--------|
| Programming exam of blocks 1, 2 and 3  | Laboratory evaluation | No          | Yes       | 40,00  |
| Multiple choice exam of blocks 1, 2 and 3.   | Written exam          | No          | Yes       | 30,00  |
| Exam of blocks 4 and 5   | Written exam          | No          | Yes       | 30,00  |
| TOTAL  |                       |             |           | 100,00 |
| Observations   |                       |             |           |        |
| In case of a new health alert by COVID-19 makes impossible the evaluation in person, remote evaluation of the works (practical laboratory exercises and written tests) would be carried out. |                       |             |           |        |
| Observations for part-time students  |                       |             |           |        |
| Part-time students who can not attend the activities of continuous assessment will be evaluated of those activities at the end of the semester.  |                       |             |           |        |

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

"Autómatas Programables. Entorno y aplicaciones", E. Mandado, J. Marcos, C. Fernández, J.I. Armesto, S. Pérez, Thomson Editores Spain, Paraninfo, 2005  
 "Autómatas Programables", J. Balcells, J.L. Romeral, Ed. Marcombo, 1997  
 "Manuales de programación de SIMATIC TIA Portal, Siemens.  
 "Fundamentos de Robótica", A. Barrientos, L.F. Penín, C. Balaguer, R. Aracil. Ed McGraw Hill, 1997  
 "Robótica, Control, Detección, Visión e Inteligencia, K.S. Fu, R.C. González, C.S.G. Lee, Ed McGraw Hill, 1988

