

SUBJECT TEACHING GUIDE

G876 - Automatic Control Systems II

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: Further Automation Module: Electrical Technology | | | | |
| Course unit title and code | G876 - Automatic Control Systems II | | | | |
| 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.
- Ability to work with discrete control systems to perform their analysis and to implement discrete regulators.

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 discrete systems, its transient response, errors and stability
 Knowledge of techniques for discrete implementation of regulators

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 | SCADA systems |
| 4 | General concepts of discrete systems. Z transform. Discrete transfer functions. Sampling and reconstruction. |
| 5 | Stability, steady state error and time response. Digital controller implementation. |

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 continuous assessment activities will be evaluated of this activities at the end of the semester. | | | | |

8. BIBLIOGRAPHY AND TEACHING MATERIALS

| BASIC |
|--|
| E. Mandado, J. Marcos, C. Fernández, J.I. Armesto, S. Pérez "Autómatas Programables. Entorno y aplicaciones, Thomson Editores Spain, Paraninfo, 2005 |
| J. Balcells, J.L. Romeral "Autómatas Programables", Ed. Marcombo, 1997 |
| Manuales Siemens TIA Portal |
| J.R. Llata García, E. González Sarabia, D. Fernández Pérez, "Problemas de Ingeniería de Sistemas: Sistemas Discretos", Ediciones TGD 1999,. |
| K. Ogata, "Sistemas de Control en Tiempo Discreto", Prentice Hall, 1996. |
| J.M. Pérez Oria, Santiago Arnaltes Gómez, "Introducción a los Sistemas de Control con Computador", Editorial Ciencia 3, 1993. |

