

SUBJECT TEACHING GUIDE

G610 - Basic Electronics: Process Control and Instrumentation

Degree in Energy Resources Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Energy Resources Engineering			Type and Year	Optional. Year 3
Faculty	School of Mines and Energy Engineering				
Discipline	Optional Subjects for Energy Resources Module: Optional Training				
Course unit title and code	G610 - Basic Electronics: Process Control and Instrumentation				
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	MARIA SANDRA ROBLA GOMEZ				
E-mail	sandra.robla@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO SANDRA ROBLA GOMEZ (S2020)				
Other lecturers	JOSE ANGEL MIGUEL DIAZ ELENA HOYOS VILLANUEVA				

3.1 LEARNING OUTCOMES

- Introduce students to the basic analysis tools for dynamic control systems.
- Study the basic types of sensors, their characteristics and applications, and the techniques for processing the information they provide.
- Provide a didactic aid tool that allows the acquisition of basic knowledge of electronics.

4. OBJECTIVES

Introduce students to the field of control systems, providing an overview of how to perform their analysis in the time domain.
 Present different sensors and transducers that are used to capture and process information necessary for the operation of control systems.
 Present electronic devices that are present in control systems.

6. COURSE ORGANIZATION

CONTENTS	
1	BASIC ELECTRONIC
1.1	Introduction
1.2	Physical principles of semiconductor materials. Electronic devices: diodes and MOS transistors.
1.3	MOS transistor amplifiers.
1.4	Operational amplifiers. Linear and non-linear applications of operational amplifiers
2	CONTROL SYSTEMS
2.1	Control: Open and closed loop. Transfer function.
2.2	Dynamic response: stability.
2.3	Stationary response: errors
2.4	Regulators
2.5	Practical cases.
3	INSTRUMENTATION
3.1	Sensors and transducers: Characteristics, families and applications.
3.2	Bridges measurement: measured at two, three or four wires
3.3	Instrumentation amplifier
3.4	Data acquisition cards.
4	Instrumentation software

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Thematic Block 1. Basic Electronic	Work	Yes	Yes	15,00
Continuous evaluation	Others	No	Yes	18,00
Thematic Blocks 2. Control Systems	Others	No	Yes	22,00
Continuous evaluation	Others	No	Yes	12,00
Thematic Blocks 3. Instrumentation	Work	Yes	Yes	15,00
Continuous evaluation	Others	No	Yes	18,00
TOTAL				100,00
Observations				
The qualification of the parts approved will be saved until the extraordinary call.				
Observations for part-time students				
<p>For students with part-time enrollment, the percentages assigned to continuous assessment and the final evaluation percentages will be the same as those assigned to students with full-time enrollment.</p> <p>If any student enrolled part-time could not attend the laboratory practices and, as a consequence, could not deliver the reports and/or carry out the follow-up tests of the same, a written exam of those practices would be carried out, in ordinary call,</p> <p>Each written exam will have the same percentage as the reports/follow-up tests of the laboratory practices provided for in the teaching guide.</p> <p>The conditions of recovery in extraordinary call, will be the same for all students enrolled in the subject.</p>				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Adel S. Sedra, Kenneth C. Smith. , Circuitos microelectrónicos, Oxford University Press, cop. 1999.
Gray, P.E., Meyer, R.G., Analysis and Design of Analog Integrated Circuits, Wiley, 1989.
Juan M ^a Pérez Oria. Sistemas Continuos de Control. TGD 1992
J. R. Llata, E. Glez. Sarabia, D. Fdez. Pérez, J. Arce Hernando, J. M ^a Pérez Oria. Problemas de Ingeniería de Sistemas: Sistemas continuos. TGD 1999
J. Díaz, J. A. Jiménez, F.J. Meca "Introducción a la Electrónica de Medida I" y "II", Ed. Universidad. de Alcalá de Henares.
J. P. Bentley "Sistemas de Medición. Principios y Aplicaciones".