

SUBJECT TEACHING GUIDE

G1072 - Automation

Degree in Marine Engineering First Degree in Marine Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Marine Engineering First Degree in Marine Engineering			Type and Year	Compulsory. Year 2 Compulsory. Year 2
Faculty	School of Maritime Engineering				
Discipline	Subject Area: Automation Module: Marine and Nautical Training				
Course unit title and code	G1072 - Automation				
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	ELIAS REVESTIDO HERRERO				
E-mail	elias.revestido@unican.es				
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Other lecturers	JOSE JOAQUÍN ARCE HIGUERA				

3.1 LEARNING OUTCOMES
- Knowing how to solve problems on automation and control methods applied to the ship and maritime installations.
- Operating electrical, electronic and control systems.
- Operating the main and auxiliary machinery and related control systems.
- Operate fuel pumping, lubrication, ballast, and other control systems.
- Maintenance and repair of electrical and electronic equipment.

4. OBJECTIVES

Introduce the principles of automation.

Know, understand and apply the fundamentals of logic systems.

know and understand the fundamentals of programmable logic systems.

know and understand the main measuring and control systems.

Knowing and handling the elements of command and action.

Introduce the principles of automatic control systems and use basic control actions.

Obtain knowledge, understanding and proficiency in the basic configuration and principles of operation of sequential control circuits and related system devices in accordance with Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

Obtain knowledge, understanding and proficiency of the basic configuration and principles of operation of various methodologies and features of automatic control as set out in Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

Obtain knowledge, understanding and proficiency of the basic configuration and operating principles and characteristics of proportional-integral-derivative (PID) control and related process control system devices, in accordance with Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

Obtain knowledge, understanding and proficiency in the basic construction and principles of operation of automatic control systems for machinery systems in accordance with Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

Obtain knowledge, understanding and proficiency of the control systems for safety and emergency procedures for the operation of propulsion machinery in accordance with Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

Obtain knowledge, understanding and proficiency of pump control systems and piping systems in accordance with Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

Obtain knowledge, understanding and proficiency in the functional and performance testing and configuration of automatic control devices in accordance with Regulation A-III/I of the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW-78).

6. SUBJECT PROGRAM

CONTENTS

1	<p>FUNDAMENTALS OF PROGRAMMABLE LOGIC CONTROLLERS:</p> <p>Introduction to automation.</p> <p>Numbering systems and codes.</p> <p>Logic gates and Boolean algebra.</p> <p>General concepts and internal structure of a programmable programmable logic controller.</p> <p>Programming of programmable logic controllers.</p>
2	<p>FUNDAMENTALS OF INSTRUMENTATION AND CONTROL::</p> <p>Introduction to instrumentation and control.</p> <p>Measurement systems and instrumentation.</p> <p>Automatic control systems.</p> <p>Controllers</p>

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Theoretical and practical questions I.	Written exam	No	Yes	40,00
Theoretical and practical questions II.	Written exam	No	Yes	40,00
Laboratory activities tracking.	Written exam	No	No	20,00
TOTAL				100,00
Observations				
In the event that the competent health and education authorities so indicate, the assessment system will be adapted to be carried out in a non-classroom mode.				
Observations for part-time students				
Part-time students will take an exam of theory and practice that will account for 100% of the mark.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Morris Mano, M. (2003) (2013). Diseño Digital. Prentice-Hall.
- Morris Mano, M.; Ciletti, M.C. (2004) (2013). Digital design. Prentice-Hall.
- Bolton, W. (2004) (2015) (2021). Instrumentation and control systems. Elsevier.