UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				**2023/24**
Subject (*)	Automatisms and Control Systems		**Code**	631G03038
Study programme	Grao en Máquinas Navais			
Descriptors				
Cycle	**Period**	**Year**	**Type**	**Credits**
Graduate	Yearly	Third	Optional	9
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Navegación e Enxeñaría MariñaEnxeñaría Industrial			
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Web				
General description	This subject aims to provide students with sufficient knowledge and skills to understand the operation of automation and control systems, being able to detect faults in them, fix them, make the design for simple cases, and implement them physically. With this, it is intended to develop the capabilities to supervise, maintain and repair the automation and control systems on board any vessel.			

Study programme competences / results	
Code	**Study programme competences / results**
A11	CE11 - Manter e reparar o equipo eléctrico e electrónico.
A18	CE18 - Supervisar o funcionamento dos sistemas eléctricos, electrónicos e de control.
A19	CE19 - Supervisar os sistemas de control automático da máquina propulsora principal e a maquinaria auxiliar.
A23	CE23 - Manter e reparar os sistemas de control automático da maquina propulsora principal e das maquinas auxiliares.
A25	CE25 - Manter e reparar os sistemas eléctricos, electrónicos e de control da maquinaria de cuberta e do equipo de manipulación da carga.
A26	CE26 - Manter e reparar os sistemas de control e seguridade do equipo de fonda.
A84	CE84 - Levar a cabo automatizacións de procesos e instalacións marítimas.
A85	CE85 - Manexar correctamente a información proveniente da instrumentación e sintonizar controladores, no ámbito da súa especialidade.
A100	CE100 - Ter a capacidade para exercer como oficial ETO da Mariña Mercante, unha vez superados os requisitos esixidos pola Administración Marítima.
B4	CB4 - Poder transmitir información, ideas, problemas e solucións a un público tanto especializado como non especializado.
B5	CB5 - Ter desenvolvido aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores con un alto grao de autonomía.
B9	CG04 - Traballar de forma autónoma con iniciativa.
B16	CG11 - Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
B17	CG12 - Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C3	CT03 - Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C8	CT08 - Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes	
Learning outcomes	**Study programme competences / results**

Interpret the documentation and diagrams of a wired or programmed automatism.	A11 A18 A25 A84 A100	B5 B9	C3
Design simple automation systems, or modify existing designs.	A11 A23 A26 A100	B9	C3 C8
Solve troubleshoot of an installation due to malfunctioning of the automation system.	A11 A18 A19 A23 A25 A26 A85 A100	B4 B16 B17	C3
Understand the relationship between the behavior of a system and its model.	A18 A19 A85 A100	B4 B5 B16 B17	C3 C8
Design and/or adjust a controller according to the requirements of the process to be controlled.	A11 A18 A19 A23 A25 A26 A85 A100	B4 B9 B17	C3 C8

Contents	
Topic	**Sub-topic**
Wired automation systems	Basic components
	Control and power diagrams
	Application to motor starting
Programmed automation systems	Types of programmable devices
	Device programming
	Applications in marine plants and installations.
System modeling and estimation	Mathematical models of dynamic systems.
	Simulation of dynamic systems.
Analysis of closed-loop control systems behavior	Process Control Systems
	Stability of closed-loop Control Systems.
Design and tuning of controllers	Controllers and applications.
	Controller tuning methodologies.
	Adaptive controllers, and performance optimization.

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**

Case study	A18 A19 A84 A85 A100 B4 B5 B9 B16 C3	14	21	35
Laboratory practice	A11 A23 A25 A26 A84 A85 A100 B9 B16 C3	40	5	45
Supervised projects	A18 A19 A85 A100 B4 B5 B9 B16 C8	5	65	70
Mixed objective/subjective test	A84 A85 A100 B4 B5 B9 B16 C3	5	0	5
Guest lecture / keynote speech	A84 A85 A100 B4 B5 B9 B16 B17 C3 C8	26	39	65
Personalized attention		5	0	5
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Case study	Together with the master session, it constitutes the expository teaching. The aim is to contextualize the knowledge of the subject in a particularized way to cases of interest. They can be the guiding basis for the tutored work.
Laboratory practice	They will be carried out in the Automation Laboratories, the Computer Room, or any other space considered appropriate and with the pertinent equipment for its realization.
Supervised projects	The aim is that the students deepen in certain topics guided by the teacher, the topics may be proposed by the teacher or by the students as long as they are appropriate to the content of the subject.
Mixed objective/subjective test	It allows under different types of statements, to assess the knowledge acquired during the course by any of the teaching methodologies used. Partial tests may be carried out during the course, releasing the final test. The students will be aware of the subject they are going to be examined in the test.
Guest lecture / keynote speech	It will take place in the classroom designated by the center and it will address the fundamental concepts for the understanding of the subject. The dynamics of the same is directed by the teacher who will try to encourage student participation as far as possible, entering into dialogue when deemed appropriate.

Personalized attention	
Methodologies	**Description**
Supervised projects Laboratory practice	In the case of both the Laboratory Practices and the Tutored Works, it is estimated that students may need to be guided in tutorial sessions to clarify their doubts.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Supervised projects	A18 A19 A85 A100 B4 B5 B9 B16 C8	The tutored works may be part of the development of the case study, or cover other different topics. The form of evaluation will also be by means of a report presented or a presentation made.	10
Case study	A18 A19 A84 A85 A100 B4 B5 B9 B16 C3	The students, guided by the teacher, will apply the general concepts developed in the subject to the case assigned to them or chosen by themselves. The evaluation can be done by means of an evaluation of a report presented or an exposition made.	10
Laboratory practice	A11 A23 A25 A26 A84 A85 A100 B9 B16 C3	The laboratory practices will be evaluated by the attendance, participation and good work of the students in them. A written report on their development and results may be required.	20

| Mixed objective/subjective test | A84 A85 A100 B4 B5 B9 B16 C3 | The mixed test may cover all the knowledge acquired during the course. As a final test in each of the opportunities, its date and place is prefixed by the Xunta de Facultad prior to the completion of student registration. In addition, there may be partial tests at the discretion of the teacher, which may result in the release of parts of the subject. The student will be informed of the content of the test and the conditions for its realization prior to its celebration. | 60 |

Assessment comments

It is possible to obtain other evaluation agreements between students and teachers, but in that case the conditions will be stated in an evaluation contract signed by the parties. And the sentence "According to what is stated in the teaching guide in the evaluation remarks" will be explicitly quoted.
The assessment criteria in Tables A-III/1 and La-III/2 of the STCW Code and related amendments shall be taken into account in the design and conduct of the assessment. If applicable.
For students with recognition of part-time dedication and academic dispensation of exemption from attendance, as established in the "NORMA QUE REGULA EL RÉGIMEN DE DEDICACIÓN AL ESTUDUDIANTES DE GRADO Y MÁSTER UNIVERSITARIO EN LA UDC (Arts. 2.3; 3.b; 4.3 and 7.5) (04/05/2017): The evaluation criteria for this student body, are the same as for full-time students.
In the case of not being able to go to the laboratory, and provided that they have the means to make it possible, the mandatory practices can be performed without going to the center using software that is licensed by the UDC or is freely distributed.

Sources of information

| Basic | - K.J. Astrom, T. Hagglund (1995). PID Controllers Theory Design and Tuning. Research Triangle Park NC : ISA
- P. Albertos, I. Mareels (2010). Feedback and Control for Everyone. New York : Springer
- F. A. Meier, C. A. Meier (2004). Instrumentation and Control Systems Documentation. Research Triangle Park, N.C. : ISA
- R. Ferreiro García (1995). Nociones sobre aplicación de PLC?s al control de procesos industriales. A Coruña: Universidade da Coruña
- R. Piedrafita Moreno (1999). Ingeniería de la automatización industrial.. Madrid:Rama |
| Complementary | |

Recommendations

Subjects that it is recommended to have taken before

Electronics and Control Systems/631G03016

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.