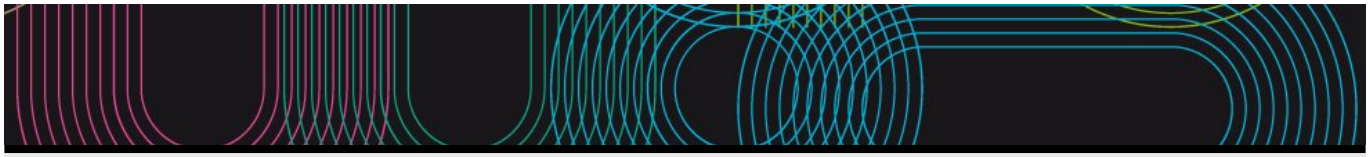

IDENTIFYING DATA				
Systems in real time				
Subject	Systems in real time			
Code	O07G410V01904			
Study programme	Grado en Ingeniería Aeroespacial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Ulloa Sande, Carlos			
Lecturers				
E-mail				
Web	http://aero.uvigo.es			
General description	Real time systems in aerospace are introduced, explaining the requeriments of real time systems for aerospace vehicles. English Friendly subject: International students may request from the teachers: a) materials and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Skills	
Code	
A2	That the students know how to apply their knowledge to their work or vocation in a professional way and that they possess the competences that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study
A3	That the students have the capability to gather and interpret relevant data (usually within their area of study) to issue judgments that include a reflection on relevant social, scientific or ethical issues
A5	That the students develop those learning capabilities necessary to undertake further studies with a high degree of autonomy.
C24	Appropriate knowledge applied to engineering: systems of aircrafts and automatic systems of flight control of the aerospace vehicles.
C31	Appropriate knowledge applied to engineering: physical phenomena of air defense systems, their qualities and their control, stability and automatic control systems.
D11	Show motivation for quality with sensitivity towards subjects within the scope of the studies

Learning outcomes			
Expected results from this subject	Training and Learning Results		
Knowledge, understanding and application of the requests of the systems in real time to the basic systems of control of flight		C24	
Knowledge, understanding and application of the requests of the systems in real time to the basic systems of control of flight	A2 A3 A5	C24 C31	D11

Contents
Topic
Reactive and real-time systems
Reliability and fault tolerance
Concurrent programming, synchronization and comunication
Human-machine interface

Real-time systems programming: real-time operating systems and synchronous/asynchronous programming	
Simulation and verification of real-time systems	

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	30	59	89
Laboratory practical	13	16	29
Mentored work	7	22.5	29.5
Objective questions exam	2.5	0	2.5
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	The professor will present in the theoretical classes the contents of the subject. The students will have basic texts of reference for the follow-up of the subject.
Laboratory practical	Computer tools will be used to solve problems and exercises and apply the knowledge obtained in the theoretical classes, and the students will have to solve similar exercises to acquire the necessary capacities
Mentored work	Project developed by the student, and mentored by the teacher

Personalized assistance	
Methodologies	**Description**
Lecturing	The professor will personally answer the doubts and queries of the students. Questions will be addressed in person, especially in the classes of problems and laboratory and tutorials, as a non-contact, by the telematic systems available for the subject
Laboratory practical	The professor will personally answer the doubts and queries of the students. Questions will be addressed in person, especially in the classes of problems and laboratory and tutorials, as a non-contact, by the telematic systems available for the subject
Mentored work	The professor will personally answer the doubts and queries of the students. Questions will be addressed in person, especially in the classes of problems and laboratory and tutorials, as a non-contact, by the telematic systems available for the subject

Assessment					
	Description	Qualification	Training and Learning Results		
Laboratory practical	Reports on practical classes, as required	20	A2 A3 A5	C24 C31	D11
Mentored work	Presentation and report on the mentored work	40	A2 A3 A5	C24 C31	D11
Objective questions exam	Examen	40	A2 A3 A5	C24 C31	D11

Other comments on the Evaluation

The calendar of evaluation tests officially approved by the Xunta de Centro of the EEAE is published on the website of the School (normally, at http://aero.uvigo.es/gl/docencia/exames)

First oportunity:

- For the evaluation of the exam to be carried out, the student must have attended all the practices and made all the required deliveries of laboratory practices and supervised work (in the case it exists), on the dates indicated; In addition, it will be necessary that the average grade of the deliveries exceeds 4 out of 10.

- The minimum mark to be reached in the final continuous assessment exam will be 4 out of 10 to be able to weigh the exam, supervised work (in case of taking the latter), and practicals. I

- To pass the subject, you must pass a weighted grade (exam, work, practice) of 5 out of 10. The exam may consist of test questions and / or short questions and / or questions developmental.

Second oportunity:

- Students who have not passed the subject in the first oportunity will take an extraordinary exam that will have the same format and the same requirements as the first oportunity. In order to pass the subject, the weighted minimum mark between exam and practice reports will be 5 out of 10, and it is also necessary that this test exceed 4 out of 10.

As a student at the University of Vigo, the University Student Statute, approved by Royal Decree 1791/2010 of December 30, establishes in its article 12, point 2d, that the university student has the duty to refrain from the use or cooperation in fraudulent procedures in assessment tests, in the work carried out or in official university documents . Therefore, the student is expected to have adequate ethical behavior. If unethical behavior is detected during the course (copying, plagiarism, use of unauthorized electronic devices or others), the student will be penalized with a grade of 0.0 on the written or deliverable test where such fraud is detected.

Sources of information

Basic Bibliography

Alan Burns, Andy Wellings, **Sistemas de tiempo real y lenguajes de programación**, 3ª, Prentice Hall, 1997

Xiacong Fan, **Real-Time Embedded Systems: design principles and engineering practices**, 1ª, Newnes, 2018

Jiacung Wang, **Real-Time embedded systems**, 1", Wiley & Sons, 2017

Complementary Bibliography

Recommendations

Subjects that it is recommended to have taken before

Air transport and airborne systems/O07G410V01404