Universida_{de}Vigo

Subject Guide 2023 / 2024

IDENTIFYING DATA Navigation and communication systems Subject Navigation and communication systems Subject Navigation and communication systems Code O07M189V01205 Study Máster programme Universitario en Sistemas Aéreos no Tripulados Descriptors ECTS Credits Choose Year Quadmester 6 Optional 1st 2nd Teaching #EnglishFriendly Ianguage Spanish Department Coordinator González Jorge, Higinio Ist 2nd Lecturers González Jorge, Higinio Ist Pression Subject Sorga Ist						
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description	General	This subject shows the fundame	entals of the main nav	vigation and com	munication syst	tems used in drones.
	description					

Training and Learning Results

Code

- A1 Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
- A2 That students know how to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
- A3 That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
- A4 That students know how to communicate their conclusions -and the ultimate knowledge and reasons that support them- to specialized and non-specialized audiences in a clear and unambiguous manner.
- A5 That students possess the learning skills that will enable them to continue studying in a manner that will be largely selfdirected or autonomous.
- B3 That students acquire the ability to analyze the needs of a company in the field of unmanned aerial systems and determine the best technological solution for it.
- B4 That students acquire the knowledge to develop unmanned aerial systems and plan specific operations, depending on the existing needs and apply the existing technological tools.
- B5 That students are able to apply, in the field of unmanned aerial systems, the principles and methodologies of research such as literature searches, data collection, data analysis and interpretation, as well as the presentation of conclusions, in a clear, concise and rigorous manner.
- C1 Knowledge about the main systems, on-board instruments and control station of an unmanned aircraft, as well as their influence on safety.
- C3 Ability to interact with other technical teams in the engineering field for the planning of operations with unmanned aerial systems.
- D6 Ability to work as part of a team.
- D7 Organizational and planning skills.
- D8 Capacity for analysis and synthesis.
- D9 Critical thinking skills and creativity.

Expected results from this subject

Expected results from this subject

Training and Learning Results

To know the classic systems of communications and navigation.	A1
	A2
	A3
	A4
	A5
	B3
	B4
	B5
	C1
	C3
	D6
	D7
	D8
	D9
To understand the operation of antennas and the range of the radio link.	A1
	A2
	A3
	A4
	A5
	B3
	B4
	B5
	C1
	C3
	D6
	D7
	D8
	D9
To understand the operation of a positioning system based on ground aids.	A1
	A2
	A3
	Α4
	A5
	B3
	B4
	B5
	C1
	C3
	D6
	D7
	D8
The second second state and second states of the second states of the second states of the second states of the	<u>D9</u>
To understand the operation of a satellite positioning system.	A1
	A2
	A3
	A4
	A5
	B3
	B4
	B5
	C1
	C3
	D6
	D7
	D8 D9

To learn the characteristics of automatic	surveillance systems based on AD	S-B.	A1 A2 A3 A4 A5 B3 B4 B5 C1 C3 D6 D7 D8 D9
Understand digital modulation systems.			A1 A2 A3 A4 A5 B3 B4 B5 C1 C3 D6 D7 D8 D9
Contents			
Торіс			
1. Geodesy and aerial navigation.			
2. Concept of frequency, wave and anten	na.		
Wave propagation.			
3. Navigation system based on ground aid	ds.		
4. Satellite-based navigation systems. AD			
	5 8		
systems.			
5. Inertial systems.			
6. Complementary filter.			
7. Kalman filter.			
8. Friis formula. Noise, signal to noise rati	O, BER		
and channel capacity.			
9. Analog and digital modulations. Adapti	ve		
modulations.			
10. MIMO techniques			
11. Advanced satellite positioning. RTK			
<u>_</u>			
Diamaina			
Planning			
	Class hours	Hours outside the	Total hours
		classroom	
Lecturing	21	21	42
Practices through ICT	21	87	108
*The information in the planning table is t			
	is guidance only and does not tar		and the students.
Methodologies			
Description			
Lecturing			
Practices through ICT			
Personalized assistance			
Methodologies	Description		
		oference	
Lecturing	Attention by e-mail and videocor		
Practices through ICT	Attention by e-mail and videocor	nference.	

Description		Qualification		Training and Learning Results			
Lecturing	Two multiple-choice tests.	50	A1	B3	C1	D6	
-	·		A2	B4	C3	D7	
			A3	B5		D8	
			A4			D9	
			A5				
Practices through ICT	Practical work deliverables.	50		B3	C1	D6	
		A2 A3 A4	B4	C3	D7		
			A3	B5		D8	
					D9		
			A5				

Other comments on the Evaluation

The student has the right to opt for the global evaluation according to the procedure and the time limit established by the center for each call.

Basic Bibliography	
Complementary Bibliography	
Mike Tooley, David Wyatt, Aircarft communications and nav	rigation systems, Elsevier, 2007
duardo Huerta, Aldo Mangiaterra, Gustavo Noguera, GPS. Pos	sicionamiento satelital, UNR Editora, 2005
4yron Kayton, WAlter R. Fried, Avionics navigation systems,	, Wiley, 1997
Robert Arán Escuer, J. R. Aragoneses Manso, Sistemas de nav	egación aérea, Paraningo, 1983

Recommendations

Subjects that it is recommended to have taken before

Aerodynamics, flight mechanics and propulsion/007M189V01103 Fundamentals of unmanned aircraft systems/007M189V01101 Operations, legislation and certification/007M189V01102 Observation systems/007M189V01104