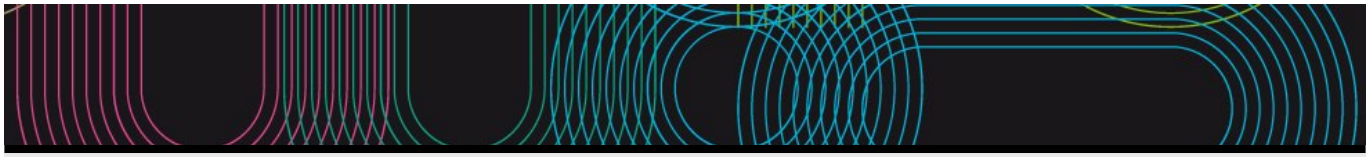

IDENTIFYING DATA				
Advanced air navigation systems				
Subject	Advanced air navigation systems			
Code	O07M197V01204			
Study programme	(*)Máster Universitario en Enxeñería Aeronáutica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	González Jorge, Higinio			
Lecturers	González Jorge, Higinio			
E-mail	higiniog@uvigo.gal			
Web	http://aero.uvigo.es			
General description	The course provides a fundamental vision of air navigation and circulation. Its objective is to describe how the information obtained by different sensors is used to allow safe and efficient air navigation.			

Training and Learning Results	
Code	
A20	Ability to define and design air traffic navigation and management systems, to design airspace, maneuvers and aeronautical easements.
A21	Adequate knowledge of avionics and on-board software, simulation and control techniques used in air navigation.
A22	Adequate knowledge of wave propagation and the problems of links with ground stations.
A23	Ability to design RADAR systems and air navigation aids.
A25	Adequate knowledge of the different regulations applicable to air navigation and air traffic, as well as the ability to certify air navigation systems.
A33	Competence to plan, design, manage and certify the procedures, infrastructures and systems that support aerospace activities, including air navigation systems.

Expected results from this subject	Training and Learning Results
Ability to define and design air traffic navigation and management systems, to design airspace, maneuvers and aeronautical easements	A20
Adequate knowledge of avionics and on-board software, simulation and control techniques used in air navigation	A21
Adequate knowledge of wave propagation and the problems of links with ground stations	A22
Ability to design RADAR systems and air navigation aids	A23
Adequate knowledge of the different regulations applicable to air navigation and air traffic, as well as the ability to certify air navigation systems	A25
Competence to plan, design, manage and certify the procedures, infrastructures and systems that support aerospace activities, including air navigation systems	A33

Contents
Topic
1. Introduction to Navigation. Aeronautical cartography. Reference system WGS84 linked to Earth.
2. Positioning by situation surfaces based on radio beacons. VOR, ILS, DME systems.

3. Satellite positioning. GPS, GLONASS, GALILEO systems. ADSB system.
4. Inertial measurement systems.
5. Algoritmos de estimación de la posición. Filtro de Kalman.
6. Airspace organization and design. Flow and separation management.
7. CNS/ATM systems. Regulations, definition of operational requirements, operation and maintenance.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	29	0	29
Laboratory practical	16.5	0	16.5
Mentored work	0	102	102
Objective questions exam	1.25	0	1.25
Objective questions exam	1.25	0	1.25

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Exposure of the contents of the subject through audiovisual media.
Laboratory practical	Troubleshooting using software tools.
Mentored work	The student will carry out a project based on technical specifications defined by the professor.

Personalized assistance

Methodologies	Description
Lecturing	Classroom attention. Tutorials with previous appointment. Attention by email. Mail: higiniog@uvigo.gal
Laboratory practical	Classroom attention. Tutorials with previous appointment. Attention by email. Mail: higiniog@uvigo.gal
Mentored work	Tutorials with previous appointment. Attention by email. Mail: higiniog@uvigo.gal

Assessment

	Description	Qualification	Training and Learning Results
Laboratory practical	Laboratory report	15	A20 A21 A22 A23 A25 A33
Mentored work	Project	15	A20 A21 A22 A23 A25 A33
Objective questions exam	Partial exam I	35	A20 A21 A22 A23 A25 A33
Objective questions exam	Partial exam II	35	A20 A21 A22 A23 A25 A33

Other comments on the Evaluation

The student has the right to opt for the global assessment according to the procedure and the deadline established by the centre for each call.

The continuous assessment will be carried out during university class hours.

The official exam dates are used for the student to take an exam-only assessment of the course if he/she does not follow the continuous assessment or fails it. This exam will correspond to 100% of the course and will have a duration of 2.5 hours.

No marks for each of the parts will be kept between different exam sessions.

The calendar of evaluation tests officially approved by the Faculty is published on the web page:

http://aero.uvigo.es/es/docencia/examenes/

Sources of information

Basic Bibliography

Francisco Javier Sáez Nieto, **Navegación aérea: Posicionamiento, Guiado y Gestión del Tráfico Aéreo**, 8415452314, Ibergarceta Publicaciones S.L., 2012

Complementary Bibliography

Luis Pérez Sanz et al., **Introducción al sistema de navegación aérea**, 8415452810, Ibergarceta Publicaciones S.L., 2013

Recommendations

Subjects that are recommended to be taken simultaneously

Avionics/O07M197V01205