



## IDENTIFYING DATA

### Meteorology

Subject	Meteorology			
Code	007G410V01905			
Study programme	(*)Grao en Enxeñaría Aeroespacial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	de la Torre Ramos, Laura			
Lecturers	de la Torre Ramos, Laura Gimeno Presa, Luís Nieto Muñiz, Raquel Olalla			
E-mail	ltr@uvigo.es			
Web	http://aero.uvigo.es			
General description	Introduction to meteorology, the measurement of parameters, the instrumentation and its influence on the flight. 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.			

## Competencies

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.
C10	Understand how the aerodynamic forces determine the dynamics of the flight and the role of the different variables therein.
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 of the meteorological effects and its causes	A2 A3 A5		D11
Understanding of the usage and impact of meteorology on aircraft operations.	A2 A3 A5	C10	D11
Understanding of the theoretical foundations of meteorological systems and instrumentation	A2 A3 A5		D11

## Contents

Topic
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Atmosphere and meteorology	atmospheric composition atmospheric structure vertical variation of pressure, temperature and density atmospheric layers according to the vertical temperature rate atmospheric layers by distribution of components the electrosphere the PBL meteors
Instrumentation and meteorological information	INSTRUMENTATION pressure, temperature, humidity, precipitation, wind, cloud height, cloud cover, visibility sounding satellite radar instruments in aeroplanes AERONAUTICAL METEOROLOGICAL INFORMATION aeronautical units OACI/ICAO organisation of the spanish aeronautical meteorological service AMA and AMDAR aeronautical climatologies meteorological reports/warnings (METAR, SPECI, TAF, SIGMET, GAMET, AIRMET, AIREP, SIGWX, airfield, lightning, storms) available meteorological information in the OMA
Thermodynamics	diagrams temperature and humidity variables levels in diagrams stability/instability evolution of dry air evolution of wet air condensation in the atmosphere instability indices
Wind	equation of movement horizontal flow without friction wind vertical variation wind structure in the PBL general circulation in the troposphere and middle atmosphere: near-surface, free atmosphere, stratosphere, mesosphere jets: tropical and extratropical local wind: sea and coastal breezes, valley and mountain, föhn effect impacts of meteorology on the flight: turbulence, shear, atmospheric waves
Clouds microphysics	Aerosols supercooled water warm clouds: nucleation, hydrometeors growth, fall, and split cold clouds: nucleation, hydrometeors growth, fall and melting, ice enhancement impacts of meteorology on the flight: icing, precipitation types
Convection	convective clouds formation single cell, multicell, supercell electricity (lightning and static electricity) convective systems arches in stormlines gusts fronts tornados cloud cells and cloud streets orographic convection impacts of the meteorology on the flight: electricity, downbursts
Visibility	factors that affect the visibility fog, mist, smoke, haze and smog fog and strata: radiation and adveccton fog, development conditions and maintenance duststorms impacts of the meteorology on the flight volcanic ashes

Depressions	airmass extratropical cyclones: types, cold, warm and occluded fronts, associated weather (visibility, turbulence, icing) tropical cyclones: regions and season of occurrence, development and maintenance conditions, extratropical transition DANA thermal and orographic laws
Meteorological prediction	numerical weather prediction: data control, computer resources, assimilation, parametrisation, ensembles, processing the model outputs, data interpretation, verification, downscaling, limited area models, nesting, initial conditions and forcings nowcast
Meteorology and space operations	Fundamental characteristics launching conditions reentry conditions influence in orbit

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	25	25	50
Computer practices	25	0	25
Practices report	0	28	28
Objective questions exam	2	20	22
Problem and/or exercise solving	0	25	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	Theoretical classes Exhibition of the main theoretical and practical contents using the computer and the blackboard. Tasks out of the classroom will be proposed in order to fix or expand the subject.
Computer practices	Seminars using computers. Personalised follow-up of the student during the class. Different exercises will be proposed in class and will be completed out of the classroom.

## Personalized assistance

Methodologies	Description
Lecturing	The follow-up of the progress of the student will be performed during master class hours and tutoring hours, verifying that all the students have understood the bases and aims of the subject. Any problem that arise will be solved in situ in the classroom or during tutoring hours
Computer practices	The follow-up of the progress of the student will be performed during seminar hours in the classroom, verifying that all the students have understood and have learnt to make the calculations and interpretations associated. Any problem that arise will be solved in situ in the classroom or during tutoring hours.

Tests	Description
Practices report	The follow-up of the progress of the student will be performed during tutoring hours. Any problem that arise will be solved in situ in the classroom or during tutoring hours.
Problem and/or exercise solving	The follow-up of the progress of the student will be performed during tutoring hours. Any problem that arise will be solved in situ in the classroom or during tutoring hours.

## Assessment

	Description	Qualification	Training and Learning Results		
Computer practices	Active participation in classes	10	A2 A3 A5	C10	D11
Practices report	Preparation of a report that the student will have to deliver and, if necessary, defend.	30	A2 A3 A5	C10	D11
Objective questions exam	Short answer questions on the theory and the resolution of two or three problems, also short, on the exercises during the seminars.	40	A2 A3 A5	C10	D11

Problem and/or exercise solving	Evaluate the student's capacity for work as well as the results of said work, both for the tasks finished during the classes and for the homework	20	A2 A3 A5	C10	D11
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## Other comments on the Evaluation

### Continuous assessment:

To pass the subject it is compulsory to assist to, at least, 21 out of the 25 hours corresponding to the practices (seminars) and deliver all the tasks proposed.

It is also compulsory to take the exam and deliver the practices report

The student will have to reach at least half of the total score in each one of the tasks.

The dates of all the examinations convocatories are the officially approved and published in the web of the Centre.

### Non-continuous assessment:

For exceptional cases

It is compulsory to deliver the practices report, as well as to take the exam, having to reach at least half of the total score in each one. In this case the score percentages are:

- 20% Practices report (seminars) (minimum score to pass the subject: 1 out of 2)
- 80% Exam (minimum score to pass the subject: 4 out of 8)

### Second convocatory:

100% exam (minimum score to pass the subject: 5 out of 10).

In case of not taking or not passing the exam, the student will be evaluated of the same way that the rest of students in the following convocatories.

### Extraordinary convocatory:

100% exam (minimum score to pass the subject: 5 out of 10).

In case of not taking or not passing the exam, the student will be evaluated of the same way that the rest of students in the following convocatories.

### Dates of the exams:

The dates of the final exams are published on the website of the EEAE in the web page

<http://aero.uvigo.es/gl/docencia/exames>.

## Sources of information

### Basic Bibliography

J. V. Iribarne, W. L. Godson, **Termodinámica de la atmósfera**, Ministerio de Medioambiente, 1996

Wallace, J.M. Y Hobbs, P, **Atmospheric Science**, Elsevier, 2006

<http://www.aemet.es/es/portada>,

[www.meted.ucar.edu/index.php](http://www.meted.ucar.edu/index.php),

### Complementary Bibliography

Bohren, C. y Albrecht, B., **Atmospheric Thermodynamics**, Oxford University Press, 1998

Houze, R.A, **Cloud Dynamics**, Academic Press, 1993

[www.zamg.ac.at/docu/Manual/SatManu/main.htm](http://www.zamg.ac.at/docu/Manual/SatManu/main.htm),

## Recommendations