



IDENTIFYING DATA

Mechanics of flight

Subject	Mechanics of flight			
Code	O07G410V01924			
Study programme	Grado en Ingeniería Aeroespacial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish English			
Department				
Coordinator	Navarro Medina, Fermín			
Lecturers	Navarro Medina, Fermín			
E-mail	fermin.navarro.medina@uvigo.es			
Web	http://aero.uvigo.es			
General description	Flight mechanics include the study of the performance, stability, and static and dynamic control of aerospace vehicles (focusing on fixed-wing aircraft in this course), as well as flight qualities and tests. 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.
B6	Capability to participate in flight testing programs for take-off and landing distances, ascent speeds, loss speeds, maneuverability and landing capacities.
C23	Appropriate knowledge applied to engineering: physical phenomena of flight, its qualities and its control, aerodynamics, propulsive forces, active control and stability.
C26	Applied knowledge of aerodynamics; mechanics and thermodynamics, flight mechanics, aircraft engineering (fixed and rotary wings), theory of structures.
C31	Appropriate knowledge applied to engineering: physical phenomena of air defense systems, their qualities and their control, stability and automatic control systems.
C33	Applied knowledge of aerodynamics, flight mechanics, air defense engineering (ballistics, missiles and air systems), space propulsion, material science and technology, structure theory.
D3	Capability of oral and written communication in native language
D4	Capability of autonomous learning and information management
D5	Capability to solve problems and draw decisions
D6	Capability for interpersonal communication
D8	Capability for critical and self-critical reasoning
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 most stood out appearances of the qualities of flight and the essays in flight of the aircraft	A5	B6	C23 C33	D8 D11

Knowledge, understanding, application, analysis and synthesis of the performances, the stability and controlabilidad static and dynamic of the aircraft.	A2	C26	D3
	A3	C31	D4
			D5
			D6

Contents

Topic	
1. Introduction to the mechanics of flight.	1.1. Introduction to the mechanics of flight. 1.2. Systems of reference and angles in mechanics of flight. 1.3. General equations of the movement.
2. Performances of gliders and aeroplanes propulsados by air jets and by alternative engines.	2.1. Performances of gliders 2.2. Performances of aeroplanes propulsados by air jets in horizontal rectilinear flight 2.3. Performances of aeroplanes propulsados by air jets in another type of flights 2.4. Performances of aeroplanes propulsados by alternative engines 2.5. Performances in takeoff and landing
3. Stability and static and dynamic control	3.1. Stability and longitudinal static control 3.2. Stability and lateral static control-directional 3.3. Introduction to the stability and dynamic control
4. Introduction to the Qualities of Flight and to the Essays in Flight.	4.1. Introduction to the Qualities of Flight and to the Essays in Flight.

Planning

	Class hours	Hours outside the classroom	Total hours
Problem solving	18	0	18
Lecturing	28	0	28
Autonomous problem solving	0	80	80
Mentored work	4	17.5	21.5
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
Problem solving	Resolution of problems and/or exercises that treat punctual appearances of the contents of the subject, developed by the professor and/or the students in the classroom.
Lecturing	Exhibition of a subject by part of the professor according to a previously established script
Autonomous problem solving	Study of the student of autonomous form, with the support of the professor if required according to the procedures established by the university
Mentored work	The tutoring work consists in the preparation of a project of design of an aircraft using the concepts learnt during the subject of mechanics of flight. It will be necessary on the other hand review key ideas of the subject of aerodynamics and aeroelasticidad. The work is of preparation in groups.

Personalized assistance

Methodologies	Description
Mentored work	The tutoring work consists in the preparation of a project of design of an aircraft using the concepts learnt during the subject of mechanics of flight. It will be necessary on the other hand review key ideas of the subject of aerodynamics and aeroelasticidad. The work is of preparation in groups.
Autonomous problem solving	Study of the student of autonomous form, with the support of the professor if required according to the procedures established by the university

Assessment

Description	Qualification Training and Learning Results					
Mentored work	The tutoring work consists in the preparation of a project of design of an aircraft using the concepts learnt during the subject of mechanics of flight. It will be necessary on the other hand review key ideas of the subject of aerodynamics and aeroelasticity. The work is of preparation in groups.	30	A2	B6	C23	D4
			A3		C26	D5
			A5		C31	D6
					C33	D8
						D11

Objective	Resolution of problems and/or conceptual questions on the questions exam contents of the subject (intermediate exam 10% and final exam 60)	70	A2 A3 A5	B6	C23 C26 C31 C33	D3 D4 D5 D8 D11
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Other comments on the Evaluation

First edition of record (continuous Evaluation, first opportunity)

To surpass the subject in the evaluation in the 1^ª opportunity will require obtain an upper qualification to 5 points over 10 in the global assessment of the continuous evaluation during the development of the classes and the examination in the official date. The qualification of the examination in official date has to be upper to 5 points on 10. The final qualification will obtain of agreement to the percentages indicated. The scored activities of the continuous evaluation will make during the lective hours of the subject, by what requires the regular assistance to the classes by part of the students.

The calendar of proofs of evaluation approved officially by the Board of Centre gives EEAE publishes in the web

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

The maximum length of the examination will be of 3 hours if there is not interruption or of 5 hours if there is an intermediate pause (being 3 maximum hours for each part).

Second edition of record (Second opportunity)

The student will have to present to the examination of second opportunity of all the contents of the subject, that will suppose 100% of the grade, if the final note of continuous evaluation is lower that 5 points over 10. Also it will have to present to the examination of second announcement in the following supposed:

- Obtain an inferior grade to 5 points over 10 in the final examination of continuous evaluation.

In case to obtain a greater qualification or the same to 5 in the examination of second opportunity, the final qualification of the subject will be the greater note from among:

- the examination of second opportunity
- the average with the activities made during the course (promediando with the percentages of the table of evaluation)

Sources of information

Basic Bibliography

Gómez Tierno M.A., Pérez Cortés M., and Puentes Márquez C., **Mecánica del vuelo**, 2, Ibergarceta Publicaciones S.L., 2012

Complementary Bibliography

PHILLIPS W., **Mechanics of Flight**, 2, John Wiley & Sons Ltd, 2009

Hull D.G., **Fundamentals of Airplane Flight Mechanics**, 1, Springer, 2007

Recommendations

Subjects that it is recommended to have taken before

Aerodynamics and aeroelasticity/O07G410V01923