



IDENTIFYING DATA

Design, calculation and certification of aerospace propulsion systems

Subject	Design, calculation and certification of aerospace propulsion systems			
Code	O07M197V01203			
Study programme	(*)Máster Universitario en Enxeñería Aeronáutica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Gómez San Juan, Alejandro Manuel			
Lecturers	Gómez San Juan, Alejandro Manuel			
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Web				
General description	In this subject the main aim is to develop the capacity to design and calculate performances of jet engines and their components.			

Training and Learning Results

Code	
A11	Ability to design, build and select the most suitable power plant for an aerospace vehicle, including self-derived power plants
A16	Adequate knowledge of aerjets, gas turbines, rocket engines and turbomachines.
A17	Ability to undertake the mechanical design of different components of a propulsion system, as well as the propulsion system as a whole.
A18	Ability to design, execute and analyze propulsion system tests, and to carry out the complete propulsion system certification process.
A19	Adequate knowledge of the different subsystems of aerospace vehicle propulsion plants.

Expected results from this subject

Expected results from this subject	Training and Learning Results
GO11. Aptitude to project, build and select the plant of power more adapted for an aerospace vehicle, including the plants of power autoderivated.	A11
GO16. Know adapted of jet engines, turbines of gas, engines rocket and turbomachinery.	A16
GO17. Capacity to tackle the mechanical design of distinct components of a propulsive system, as well as of the system propulsive in his group.	A17
GO18. Capacity to design, execute and analyse the essays of propulsive systems , and to carry out the complete process of certification of the same..	A18
GO19. Suitable knowledge of the distinct subsystems of the propulsive plants of aerospace vehicles.	A19

Contents

Topic	
Performances of jet engines	-Global performances: biaxial, turbofans, -Performances of components: takings, compressors, cameras of combustion, turbines, nozzles -Non- steady state performances

Essays and material	-Banks of essays -Calculation of the no measured parameters -Models pre-essay -Material used in jet engines
Multidisciplinary appearances of propulsive systems	-Interaction with other subsystems -objective Functions -Application to the design of systems of control -Other appearances to consider
Technicians of simulation	-Types of models of jet engines -Decomposition of systems -Levels of fidelity

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	29	30	59
Problem solving	16.5	40	56.5
Mentored work	0	32	32
Essay questions exam	2	0	2
Essay	0.5	0	0.5

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

Methodologies

	Description
Lecturing	Exhibition by part of the professor of the contents on the matter object of study, theoretical bases and guidelines of a work or exercise that the/the student has to develop.
Problem solving	Activity in which they formulate problems and /or exercises related with the matter. The student has to develop the suitable solutions by means of the exertion of routines, the application of formulas or algorithms, the application of procedures of transformation of the available information and the interpretation of the results. It is used to employ as I complement of the theoretical lesson
Mentored work	Activity in which they formulate a problem of design related with the matter. The student has to develop by his account the suitable solutions by means of the exertion of routines, the application of formulas or algorithms. At the end of the course has to present the work in class

Personalized assistance

Methodologies Description

Problem solving	Realisation of practical problems on the contents of the subject, the which will be explained and initiated in the classroom to be finished and delivered by part of the students out of the classroom. The students will have of the personal lessons necessary with the professor for the follow-up of the development of the cases of study
Mentored work	Realisation of a work on the contents of the subject, the which will be explained and initiated in the classroom to be finished and delivered by part of the students out of the classroom. The students will have of the personal lessons necessary with the professor for the follow-up of the development of the cases of study

Assessment

	Description	Qualification	Training and Learning Results
Essay questions exam	(*)Dous exames baseados na resolución de problemas e/ou preguntas conceptuais sobre os contidos da materia. O primeiro realizarase en clase e o segundo será en data de exame oficial. Nota mínima de 5.0. Cada exame valerá o 40% da nota final.	80	A11 A16 A17 A18 A19
Essay	(*)Traballo que consiste no deseño dun sistema de propulsión cos conceptos apresos na materia e con presentación en clase	20	A11 A16 A17 A18 A19

Other comments on the Evaluation

First Opportunity Evaluation

To pass the subject on the 1st opportunity, it will be necessary to obtain a grade higher than 5 out of 10 in the overall assessment of continuous evaluation during the course and the exam on the official date. Additionally, the grade for the official exam must be equal to or higher than 5 out of 10. The final grade for continuous evaluation will be determined according to the indicated percentages.

For the overall evaluation, there will be an exam on the official date, which includes all the contents of the subject, including the contents and methods used in the coursework. The passing grade for this exam will be 5 out of 10.

The officially approved schedule of evaluation tests by the EEAE Center Board will be published on the website:

<http://aero.uvigo.es/en/docencia/exams>

The continuous evaluation tests will be conducted during regular class hours.

Students have the right to choose the overall evaluation procedure and deadline set by the institution for each examination session.

Second Opportunity Evaluation

Students must take the resit exam, which covers all the subject contents and accounts for 100% of the final grade, if the final grade for continuous evaluation is lower than 5 out of 10. They must also take the resit exam in the following cases:

- Obtaining a grade lower than 5 out of 10 in the final exam of the first opportunity.

If a grade equal to or higher than 5 is obtained in the resit exam, the final grade for the subject will be the higher grade between:

- The resit exam grade.
- The average grade from the coursework activities (taking into account the percentage distribution specified in the evaluation table, substituting the grade of the first opportunity exam with the grade of the resit exam).

Final Year Evaluation

For the final year evaluation, there will be an exam on the official date, covering all the subject contents. The passing grade for this exam will be 5 out of 10.

Sources of information

Basic Bibliography

Complementary Bibliography

J.L Kerrebrock, **Aircraft Engines and Gas Turbines**, 978-0262534031, 2, MIT Press, 1992

G. Sutton, **Rocket Propulsion Elements**, 978-1118753651, 9, Wiley, 2016

Recommendations

Subjects that it is recommended to have taken before

Design, calculation and certification of aircraft and space vehicles/O07M197V01103
