1. BASIC INFORMATION

Course	Aerospace Technology
Degree program	Degree in Aerospace Engineering
School	School of Architecture, Engineering and Design
Year	First year
ECTS	6
Credit type	Mandatory
Language(s)	English
Delivery mode	Face to face
Semester	First semester
Academic year	2024/2025
Coordinating professor	Miguel Ángel Lendínez Fernández

2. PRESENTATION

This course belongs to the "Aerospace systems and infrastructures" module:

- Aerospace Technology 6 ECTS (first year)
- Navigation Systems I 6 ECTS (first year)
- Navigation Systems II 6 ECTS (second year)
- Air Transport 6 ECTS (second year)

The purpose of this subject is for students to acquire a broad and general knowledge of Aerospace Engineering that allows them to assimilate and understand the basics of the different subjects that underlie their area of knowledge, especially Fluid Mechanics, Thermodynamics, Aerodynamics, Flight Mechanics, Structures, Propulsion and Orbital Mechanics.

At the end of the subject the student should be able to:

- Conceptualize and correctly solve a diverse set of aerospace engineering problems at an introductory level
- Form a big picture that connects the different branches of Aerospace Engineering
- Have a sound engineering knowledge basis to address with guarantees the subjects of the following courses.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB1. That students have demonstrated knowledge and understanding in a field of study that part of the basis of general secondary education, and is usually found at a level that, while supported by advanced textbooks, includes some aspects of knowledge of the forefront of their field of study.

Cross-curricular competencies:

- CT1. Ability for the design, development and management in the field of aeronautical
- engineering whose objective is, in accordance with the knowledge acquired in accordance with section 5 of Orden Ministerial CIN / 308/2009, aerospace vehicles.
- CT6. Ability to participate in test flights to take measurements of take-off distance, climb speed, stall speed, maneuverability, and landing performances.
- CT12. Knowledge of basic subjects and technologies, which will enable him/her to learn new methods, theories and technologies, as well as to give him/her great versatility to adapt to new situations (autonomous learning).
- CT18. Commit to fulfill the tasks entrusted (Responsibility)
- CT19. Work in interdisciplinary teams, providing the greatest effectiveness on the basis of cooperation, assuming their role within the team, establishing good relationships and exchanging information, and practicing the culture of peace and solidarity (Teamwork)
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Specific competencies:

- CE10. To understand how aerodynamics forces determine flight dynamics, and the influence of variables involved in flight phenomena.
- CE18. Appropriate knowledge applied to engineering of: basics of fluid mechanics; basic principles of flight control and automation; main characteristics and physical and mechanical properties of materials.
- CE19. Applied knowledge of: the science and technology of materials, mechanics and thermodynamics, fluid mechanics, aerodynamics and flight mechanics, navigation and air traffic, aerospace technology, theory of structures, air transport, economy and production projects; impact on environment

Learning outcomes:

- Conceptualize an engineering problem, propose the approach to solve it, and find the best solution, based on a series of requirements, and previous information. All this related to the competences of this module.
- Move parts of an engineering problem to the laboratory, and use this resource as support to solve it.

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB1, CT1, CT6, CT12, CT12, CE10, CE18, CE19	Conceptualize an engineering problem, propose the approach to solve it, and find the best solution, based on a series of requirements, and previous information. All this related to the competences of this module.
CB1, CT1, CT18, CT19, CE10, CE18	Move parts of an engineering problem to the laboratory and use this resource as support to solve it.

4. CONTENT

The subject matter is divided into seven learning units:

1. Foundations
   1.1 Introduction to aerospace engineering
   1.2 Magnitudes and units
   1.3 Energy and Momentum
   1.4 Atmospheric and space environment, International Standard Atmosphere, Altimetry
2. Flight Science 1
   2.1 Fundamental physics, Basic fluid dynamics
   2.2 Aerodynamics 1
   2.3 2D Aerodynamics
   2.3 3D Aerodynamics
3. Introduction to propulsion
   3.1 Basic concepts
   3.2 Propeller Engines
   3.3 Jet Engines
   3.4 Rocket Engines
4. Aircraft systems and structures
   4.1 Aircraft Architecture and Classification. Introduction to aeronautical structures
   4.2 Helicopters
5. Flight Science 2
   5.1 Performance
   5.2 Stability and Control
6. Airports
   6.1 Fundamentals of airports
7. Introduction to space flight
   7.1 Introduction to orbital mechanics
   7.2 Space systems architecture and Classification
   7.3 Space Missions

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Survey of objectives and interests
- Lecture-based class
- Laboratory practices
- Research by groups or problem solving by groups
- Designs
- Field experiences, conferences, visits to companies and institutions

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Lecture based class	52
Integrative team work	48
Self-Study	30
Mentoring, academic monitoring and assessment	20
TOTAL	**150**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Exams, tests and other knowledge tests	35 %
Homework Handouts	20 %
Final project	35 %
Cross-curricular skills	10 %

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, the student must meet all the following conditions as a minimum:

- A grade greater than or equal to 5.0 out of 10.0 in the final grade (weighted average) of the course.
- A grade greater than or equal to 5.0 out of 10.0 in the final exam.
- A grade greater than or equal to 5.0 out of 10.0 in each of the assignments (individual and group ones).

When the minimum required to perform the weighted average of the evaluable activities is not met (the minimum is not reached in any of the above points), the final grade will be:

- The weighted average if its value is less than or equal to 4.
- 4 if the weighted average value is greater than 4.

The grade in first exam period will be considered as NP (not presented) when the student has not submitted any evaluable activity of those that are part of the weighted average.

7.2. Second exam period

Those items that were passed in the first exam period will not have to be submitted again, and they will be taken into account for the final grade in the extraordinary call.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

To pass the course in the second exam period, the student must meet all the following conditions as a minimum:

- A grade greater than or equal to 5.0 out of 10.0 in the final grade (weighted average) of the course.
- A grade greater than or equal to 5.0 out of 10.0 in the final exam.
- A grade greater than or equal to 5.0 out of 10.0 in each of the assignments (individual and group ones).

When the minimum required to perform the weighted average of the evaluable activities is not met (the minimum is not reached in any of the above points), the final grade will be:

- The weighted average if its value is less than or equal to 4.
- 4 if the weighted average value is greater than 4.

The grade in extraordinary session will be considered as NP (not presented) in this session when the student has not submitted any new activity with respect to what was submitted in the ordinary session.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Problems set I	Week XX
Problems set II	Week XX
Problems set III	Week XX
Final Group Project	Week XX
Final exam	First semester, ordinary call exam period

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

- Introduction to Flight. Sixth Edition. John D. Andersson, Jr. Mc Graw Hill, 2016.
- Introducción a la Ingeniería Aeroespacial. 2ª Edición. Sebastian Franchini y Óscar Lopez. Garceta, 2011.
- Fundamentals of Aerospace Engineering. 2nd Edition.
- An introductory course to aeronautical engineering. Manuel Soler, Manuel Soler [Ed.], 2017.
- Introduction to Aerospace Engineering with a Flight Test Perspective. Stephen Corda. John Wiley & Sons Ltd. 2017.

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.