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	2025/2026
Coordinating professor	Miguel Ángel Lendínez Fernández
Other professors	Moisés Zarzoso, Gabriel Zarzoso

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. KNOWLEDGE, SKILLS AND COMPETENCES

Knowledges:

CON08 CO04. Understanding how aerodynamic forces determine flight dynamics and the role of various variables involved in the phenomenon of flight.

CON11 CO07. Understanding the uniqueness of airport infrastructure, buildings, and operations.

CON18. Identify the history of aeronautical engineering and analyze and evaluate the different elements and activities that belong to the aeronautical sector.

Specific knowledge of the subject:

- Identify the basic concepts of aerospace engineering.
- Describe the architecture of aircraft and space systems.
- Define the fundamentals of flight physics I: basic aerodynamics.
- Define the fundamentals of flight physics II: basic flight mechanics.
- Identify aerospace propulsion systems.
- Describe the fundamentals of space flight.

Skills:

HAB01 FB01. Ability to solve mathematical problems that may arise in engineering. Aptitude to apply knowledge of: linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics, and optimization.

Specific skills of the subject:

- Establish models as input for fluid dynamics simulators.
- Conduct studies involving technologies and engineering procedures related to the competencies of this module.
- Conceptualize an engineering problem, outline the approach to solving it, and find the optimal solution based on a set of requirements and previous information, all related to the competencies of this module.
- Transfer parts of an engineering problem to the laboratory and use this resource as support for resolution.
- Solve problems in fluid statics, fluid dynamics, and flow through turbomachinery.
- Analyze surfaces of discontinuity.
- Evaluate basic concepts of turbulent motion.
- Analyze major aerospace propulsion systems.
- Conduct basic practices with fluid dynamics simulators.

Competencies:

- **CP02**. 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.
- **CP03**. 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.
- **CP12**. Generate new ideas and concepts from known ideas and concepts, reaching conclusions or solving problems, challenges, and situations in an original way in the academic and professional environment.
- **CP13**. Convey messages (ideas, concepts, feelings, arguments), both orally and in writing, strategically aligning the interests of the various parties involved in communication in the academic and professional environment in the field of aerospace engineering.
- **CP14**. Employ information and communication technologies for data search and analysis, research, communication, and learning in the field of aerospace engineering.
- **CP15**. Influence others to guide and lead them towards specific objectives and goals, taking into consideration their viewpoints, especially in professional situations arising from the volatile, uncertain, complex, and ambiguous (VUCA) environments of the current world.
- **CP16**. Collaborate with others in achieving a shared academic or professional objective, actively participating, demonstrating empathy, and practicing active listening and respect for all team members.
- **CP17.** Integrate analysis with critical thinking in an evaluation process of different ideas or professional possibilities and their potential for error, relying on evidence and objective data that lead to effective and valid decision-making.
- **CP18**. Adapt to adverse, unexpected situations that cause stress, whether personal or professional, overcoming them and even turning them into opportunities for positive change.
- **CP19**. Demonstrate ethical behavior and social commitment in the performance of professional activities, as well as sensitivity to inequality and diversity.

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. Introduction to space flight
   6.1 Introduction to orbital mechanics
   6.2 Space systems architecture and Classification
   6.3 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:

Learning activity	Number of hours	In-class time	Use of IA
Lecture based class	30	30 (100%)	Not permitted
Laboratory and/or problem-solving session	16	16(100%)	Not permitted
Integrative team work	30	14 (47%)	Suggested
Self-Study	74	0	Suggested
TOTAL	**150**	**60**	

7. ASSESSMENT

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

Assessment system	Weight	Use of IA
AA1. Exams, tests and other knowledge tests	35 %	Not permitted
AA2. Elaborations of articles and reports	25 %	Suggested
AA3. Alternative evaluation techniques	20 %	Not permitted
AA4. Field experiences, conferences and visits(*)	10 %	Suggested
Cross-curricular skills (rubrics)	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.
(*) If this activity is not possible for some reason, its weight will be split evenly between AA2 and AA3.

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).
- At least 50% of attendance

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 considered 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 7
Problems set II	Week 11
Problems set III	Week 17
Individual Project	Week 8
Group Project	Week 17
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.