



1. General information

Course: ORBITAL MECHANICS AND FLIGHT DYNAMICS**Code:** 56726**Type:** CORE COURSE**ECTS credits:** 6**Degree:** 403 - UNDERGRADUATE DEGREE PROGRAMME IN AEROSPACE ENGINEERING**Academic year:** 2023-24**Center:** 303 - E.DE INGENIERÍA INDUSTRIAL Y AEROESPACIAL DE TOLEDO**Group(s):** 40**Year:** 3**Duration:** C2**Main language:** Spanish**Second language:****Use of additional languages:****English Friendly:** N**Web site:****Bilingual:** N**Lecturer:** JOSÉ IGNACIO NOGUEIRA GORIBA - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
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2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

Not established

4. Degree competences achieved in this course

Course competences

Code	Description
CA01	Ability to carry out bibliographic searches, use databases and other sources of information for its application in tasks related to Technical Aeronautical Engineering.
CA02	Ability to efficiently design experimentation procedures, interpret the data obtained and specify valid conclusions in the field of Aeronautical Technical Engineering.
CA03	Ability to autonomously select and carry out the appropriate experimental procedure, operating the equipment correctly, in the analysis of phenomena within the scope of Engineering.
CA04	Ability to select advanced tools and techniques and their application in the field of Aeronautical Technical Engineering.
CA05	Knowledge of the methods, techniques and tools as well as their limitations in the application for the resolution of problems typical of Aeronautical Technical Engineering.
CA06	Ability to identify and assess the effects of any solution in the field of Aeronautical Technical Engineering within a broad and global context and the ability to interrelate the solution to an engineering problem with other variables beyond the technological field, which must be considered.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CE02	Understanding and command of the basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application to solve engineering problems.
CE10	Knowledge of flight dynamics based on aerodynamic forces and the role of the different variables involved in the phenomenon of flight
CE18	Knowledge applied to Engineering of: The fundamentals of fluid mechanics; the basic principles of flight control and automation; the main characteristics and physical and mechanical properties of materials.
CE19	Applied knowledge of: materials science and technology; mechanics and thermodynamics; fluid mechanics; aerodynamics and mechanics of flight; air traffic and navigation systems; aerospace technology; structure theory; air Transport; economy and production; Projects; environmental impact.
CE20	Knowledge applied to Engineering of: The fundamentals of sustainability, maintainability and operability of space systems.
CE24	Knowledge applied to Engineering of: The physical phenomena of the flight of aerial defense systems, their qualities and their control, actions, stability and automatic control systems.
CE25	Knowledge applied to Engineering of: The methods of calculation and development of defense materials and systems; the management of experimental techniques, equipment and measuring instruments typical of the discipline; the numerical simulation of the most significant physical-mathematical processes; inspection, quality control and fault detection techniques; the most appropriate repair methods and techniques.
CE26	Applied knowledge of: aerodynamics; flight mechanics, air defense engineering (ballistics, missiles and air systems), space propulsion, materials science and technology, structural theory.
CG01	Capacity for the design, development and management in the field of aeronautical engineering that have as their object, in accordance with the knowledge acquired as established in section 5 of order CIN/308/2009, aerospace vehicles, propulsion systems aerospace, aerospace materials, airport infrastructures, air navigation infrastructures and any space, traffic and air transport management system.
CG06	Ability to participate in flight test programs to collect data on takeoff distances, climb rates, stall rates, maneuverability, and landing capabilities.
CG08	Knowledge, understanding and ability to apply the necessary legislation in the exercise of the profession of Aeronautical Technical

5. Objectives or Learning Outcomes**Course learning outcomes**

Description

6. Units / Contents

Unit 1:
Unit 2:
Unit 3:
Unit 4:
Unit 5:
Unit 6:
Unit 7:
Unit 8:
Unit 9:
Unit 10:
Unit 11:
Unit 12:

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CA02 CA03 CA04 CA05 CA06 CB02 CB03 CB04 CB05 CE02 CE10 CE18 CE19 CE20 CE24 CE25 CE26 CG01 CG06 CG08	1.6	40	N	-	
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CA02 CA03 CA04 CA05 CA06 CB02 CB03 CB04 CB05 CE02 CE10 CE18 CE19 CE20 CE24 CE25 CE26 CG01 CG06 CG08 CT03	0.4	10	N	-	
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CA02 CA03 CA04 CA05 CA06 CB02 CB03 CB04 CB05 CE02 CE10 CE18 CE19 CE20 CE24 CE25 CE26 CG01 CG06 CG08 CT03	0.24	6	Y	Y	
Writing of reports or projects [OFF-SITE]	Cooperative / Collaborative Learning	CA01 CA02 CA03 CA04 CA05 CA06 CB02 CB03 CB04 CB05 CE02 CE10 CE18 CE19 CE20 CE24 CE25 CE26 CG01 CG06 CG08 CT03	0.6	15	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	CA01 CA02 CA03 CA04 CA05 CA06 CB02 CB03 CB04 CB05 CE02 CE10 CE18 CE19 CE20 CE24 CE25 CE26 CG01 CG06 CG08	3	75	N	-	
Final test [ON-SITE]	Assessment tests	CA01 CA02 CA03 CA04 CA05 CA06 CB02 CB03 CB04 CB05 CE02 CE10 CE18 CE19 CE20 CE24 CE25 CE26 CG01 CG06 CG08 CT03	0.16	4	Y	Y	
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of problem solving and/or case studies	20.00%	20.00%	
Practicum and practical activities reports assessment	10.00%	10.00%	
Final test	70.00%	70.00%	

Total:	100.00%	100.00%	
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According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	6
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	15
Final test [PRESENCIAL][Assessment tests]	4
Unit 1 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	8
Unit 2 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	2.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	17
Unit 3 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Unit 4 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	10
Unit 5 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Unit 6 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Unit 7 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Unit 8 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	6
Unit 9 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Unit 10 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Unit 11 (de 12):	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Unit 12 (de 12):	
Activities	Hours

Class Attendance (theory) [PRESENCIAL][Lectures]	2
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	40
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	6
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	10
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	15
Study and Exam Preparation [AUTÓNOMA][Self-study]	75
Final test [PRESENCIAL][Assessment tests]	4
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Tomás Elices	Introducción a la Dinámica Espacial	INTA		8460603822, 97884606	1991	
Anderson, John D.	Aircraft performance and design	McGraw-Hill		978-0-07-070245-5	2012	Fifth reprint