

205203 - Introduction to Rockets

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering		
Teaching unit:	748 - FIS - Department of Physics		
Academic year:	2019		
Degree:	BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Optional)		
ECTS credits:	3	Teaching languages:	English

Teaching staff

Coordinator:	Manel Soria Arnau Miró
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Teaching methodology

The course will be developed through theoretical lectures, hands-on sessions with simulation software (ready available and to be developed by the students) and laboratory sessions, where the students will develop their own instrumentation to test small scale rockets and rocket engines.

Learning objectives of the subject

- Be familiar with rockets and their historic importance.
- Know and understand the basic rocket components.
- Understand the fundamentals of rocket propulsion and the different engine types.
- Understand the thermodynamics of rocket engines.
- Understand how rocket trajectories can be simulated.
- Be familiar with rocket test bench instrumentation.

Study load

Total learning time: 75h	Hours large group:	30h	40.00%
	Hours medium group:	0h	0.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	45h	60.00%

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Content

Module 1: Fundamentals of rockets	Learning time: 25h Theory classes: 10h Self study : 15h
<p>Description:</p> <ul style="list-style-type: none"> * History * Main rocket components components * Multiple stage rockets * Case study: SpaceX * Thermodynamics of rocket engines 	
Module 2: Rocket trajectories	Learning time: 25h Theory classes: 10h Self study : 15h
<p>Description:</p> <ul style="list-style-type: none"> * Study of basic rocket launch maneuvers with Kerbal Space simulator. * Two-dimensional model of rocket launch. 	
Module 3: Experimental testing of rockets and rocket engines.	Learning time: 25h Theory classes: 10h Self study : 15h
<p>Description:</p> <ul style="list-style-type: none"> * Test bench and rocket instrumentation: load cells, data loggers, GPS, IMU * Rocket telemetry systems * Hands on session: test of a rocket engine * Hands on session: launch and recovery of a rocket with data loggers and/or telemetry systems 	

Qualification system

Class participation and class exercises: 30%

Assignment: 30%

Project: 40%

Students with a grade below 5.0 in the project, or the assignments, or the classroom participation, will be able to take an additional written exam covering all the subject, that will take place the date fixed in the calendar of final exams. The grade obtained in this test will range between 0 and 10, and will replace that of the part or parts below 5.0 only in case it is higher, up to a maximum of 5.0 points

Bibliography