

## 220143 - Uav Hardware & Programming

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
 Teaching unit: 710 - EEL - Department of Electronic Engineering  
 Academic year: 2019  
 Degree: 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: David Gonzalez

### Teaching methodology

This is a course "hands-on" oriented. This means that all subject will be delivered in the lab with hardware availability. However, the course will also content some lectures focused in some theoretical issues. Students will be asked to develop some tasks that synthetize several concepts and knowledge acquired in previous or current courses.

### Learning objectives of the subject

The goal of this subject is to deliver basic knowledge about electric propulsion, control hardware and programming of GNC tasks. At the end of this subject, student should be able to program GNC algorithms in a given hardware by they own.

### Study load

Total learning time: 75h	Hours large group:	30h	40.00%
	Self study:	45h	60.00%

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### Content

<p>Module 1: General description of UAV architecture</p>	<p>Learning time: 7h 30m Theory classes: 3h Self study : 4h 30m</p>
<p>Description: - Description of a UAV architecture from the control hardware point of view.</p>	
<p>Module 2: Control hardware functionality</p>	<p>Learning time: 7h 30m Theory classes: 3h Self study : 4h 30m</p>
<p>Description: - The functionality and capabilities of the experimental platform used in this course will be described. This platform is the MultiWii Pirate control board (Arduino compatible)</p>	
<p>Module 3: Basics of electric propulsion</p>	<p>Learning time: 15h Theory classes: 6h Self study : 9h</p>
<p>Description: - Basic concepts of electric propulsion will be delivered. It will be covered concepts as: power converters (inverters), batteries behavior and modeling, and basics of electric motors</p>	
<p>Module 4: Implementation of GNC algorithms</p>	<p>Learning time: 30h Theory classes: 12h Self study : 18h</p>
<p>Description:</p>	
<p>Module 5: Basics of data storage and data transmission</p>	<p>Learning time: 15h Theory classes: 6h Self study : 9h</p>
<p>Description:</p>	



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### Qualification system

The grade of the subject is based on 4 individual reports delivered individually by students. Students will be asked to perform a speech presentation of the final report.

$\text{Subject\_Grade} = (0.25 * \text{Report\_1} + 0.25 * \text{Report\_2} + 0.25 * \text{Report\_3} + 0.25 * \text{Report\_4})$

Any student who wishes to improve his grade may try it at the exam planned at the end of the course. The best note is preserved

### Bibliography