Guia docent
205224 - 205224 - Exploració Robòtica del Sistema Solar

Última modificació: 29/05/2020

Unitat responsable: Escola Superior d'Enginyeries Industrial, Aeroespacial i Audiovisual de Terrassa
Unitat que imparteix: 748 - FIS - Departament de Física.
Titulació: GRAU EN ENGINYERIA EN VEHICLES AEROESPACIALS (Pla 2010). (Assignatura optativa).
            GRAU EN ENGINYERIA EN TECNOLOGIES AEROESPACIALS (Pla 2010). (Assignatura optativa).
Curs: 2020  Crèdits ECTS: 3.0  Idiomes: Anglès

PROFESSORAT

Professorat responsable: Manel Soria
Altres: Manel Soria

CAPACITATS PRÈVIES

It is advisable to have taken the course 220013 Vehicles Aeroespaciais.

REQUISITS

METODOLOGIES DOCENTS

The course will be developed through theoretical lectures and hands-on sessions where the students will study previous robotic probes and their scientific results. In many cases, the students will need to develop small computer codes to process the large amounts of data available. Where possible, the original data such as RAW images or SPICE kernels will be used for the class examples, as well as the original journal papers.

OBJECTIUS D'APRENENTATGE DE L'ASSIGNATURA

- Have a basic knowledge of the main solar system bodies and the main present, projected and previous exploration probes such as Voyager or Cassini.
- Understand at an introductory level the main space engineering concepts involved in the design of the probes, such as attitude control system, electric power or propulsion.
- Understand the main remote sensig instruments and techniques such as multispectral cameras or radio occultation at an introductory level.
- Understand at an introductory level the digital image formats and main processing algorithms such as contrast adjustment or registration.
- Understand at an introductory level the NASA SPICE library (goal, main functions, kernels, etc) and be able to use it to calculate the position, velocity, camera orientation etc of different spacecraft.
- Be able to combine SPICE kernels with RAW images information to produce relevant information of celestial bodies (such as, for instance, volcanic eruptions in Io).
HORES TOTALS DE DEDICACIÓ DE L'ESTUDIANTAT

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<td>Hores aprenentatge autònom</td>
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Dedicació total: 75 h

CONTINGUTS

Module 1: Introduction to the Solar System and its exploration

Descripció:
Solar system bodies (planets, asteroids, comets, Kuiper belt objects). Robotic probes and their missions: Flyby encounters, orbiters, landers, rovers, drones.

Dedicació: 25h
Grup gran/Teoria: 10h
Aprenentatge autònom: 15h

Module II. Introduction to imaging instruments and image processing technology

Descripció:

Dedicació: 25h
Grup gran/Teoria: 10h
Aprenentatge autònom: 15h

Module III. Introduction to NASA JPL SPICE library

Descripció:

Dedicació: 25h
Grup gran/Teoria: 10h
Aprenentatge autònom: 15h

SISTEMA DE QUALIFICACIÓ

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 in the date fixed in the calendar of final exams. The grade obtained in this exam will range between 0 and 10, and will replace the part or parts below 5.0 only in case it is higher, up to a maximum of 5.0 points.
BIBLIOGRAFIA

Bàsica:

Complementària: