uc3m | Universidad Carlos III de Madrid

Onboard data handling and telemetry

Academic Year: (2019 / 2020)   **Review date: 21-04-2020**

Department assigned to the subject:

Coordinating teacher: REVIRIEGO VASALLO, PEDRO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

OBJECTIVES

Learning results:

- Know the operation of on-board data processing, the existing protocols, and the use of telemetry.
- Understand the design process of the on-board data management system

Competences:

- CB6 To possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.

- CB7 Students must know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

- CB8 Students must be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.

- CB9 Students must know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way.

- CB10 Students must have the learning skills allowing them to continue studying in a way that will be largely self-directed or autonomous.

- CG1 Capacity for the formulation, critical verification and defense of hypotheses, as well as the design of experimental tests for verification.

- CG2 Ability to make value judgments and prioritize in making conflicting decisions using systemic thinking.

- CG4 Ability to work in multidisciplinary teams in a cooperative way to complete work tasks.

- CG5 Ability to handle the English, technical and colloquial language.

- CE11 Ability to understand and apply the knowledge, methods and tools of space engineering to the analysis and design of the communication subsystem of space vehicles.

DESCRIPTION OF CONTENTS: PROGRAMME

1 Onboard Data Handling Architectures
2 Onboard Communications
3 Packet Utilization Service
4 Onboard telemetries and its management
5 Failure Detection Isolation & Recovery
6 Onboard Redundancy & Reconfiguration
7 Data Handling Budgets

8 Data Handling Development Cycle
9 Space signal encryption
10 Inter Satellite Networks
11 Onboard Data Handling in New Space

ASSESSMENT SYSTEM

SE2 Assignments
SE3 End of term examl

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- G. Maral, M. Bousquet and Z. Sun Satellite Communications Systems: Systems, Techniques and Technology, Wiley, 2009

ADDITIONAL BIBLIOGRAPHY

- M. Macdonald and V. Badescu The International Handbook of Space Technology, Springer, 2014

- P. Fortescue, G. Swinerd and J. Stark (Editors) Spacecraft Systems Engineering, 4th Edition, John Wiley, 2012

BASIC ELECTRONIC RESOURCES

- ESA . Onboard_Computer_and_Data_Handling:
http://www.esa.int/Our_Activities/Space_Engineering_Technology/Onboard_Computer_and_Data_Handling/Architectures_of_Onboard_Data_Systems