Vehicle Automation

Academic Year: **(2019 / 2020)**   **Review date: 20-04-2020**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: ARMINGOL MORENO, JOSE MARIA

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Industrial Automation I
Control Engineering

OBJECTIVES

By the end of this content area, students will be able to have:
1.   coherent knowledge of their branch of engineering including some at the forefront of the branch in vehicle automation applications;
2.   the ability to apply their knowledge and understanding of automation applications to identify, formulate and solve engineering problems using established methods in vehicle automation;
3.   the ability to apply their knowledge and understanding to develop and realise designs of automation applications to meet defined and specified requirements (localization, control and communications);
4.   workshop and instrumentation skills.
5.   an understanding of applicable techniques and methods in automation applications, and of their limitations;
6.   demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice;

DESCRIPTION OF CONTENTS: PROGRAMME

1- Introduction.
2- Automotive embedded systems.
    2.1 - Safety features in cars
    2.2 - Advanced driver assistance systems
    2.3 - Intelligent vehicles
3- Rail embedded systems.
    3.1 - Railway installations
    3.2 - Rail signalling system
    3.3 - Maintenance
4- Aircraft embedded systems.
    4.1 - Flight control systems
    4.2 - Air navigation
    4.3 - Unmanned Air systems
5- Traffic Control Systems.
    5.1- Road, Railroad and Aerial Safety
    5.2 - Environmental impact

LEARNING ACTIVITIES AND METHODOLOGY

- Skillful classes, classes of resolution of doubts in reduced groups, individual presentations of the students, individual tutorials   and personal work of the student; oriented to the theoretical knowledge acquisition (3 credits ECTS).
- Practices of laboratory and individual classes of problems in reduced groups, individual tutorials and personal work of the student; oriented to the acquisition of practical abilities related to the program of the subject (3 credits ECTS).

Continuous evaluation based on works, participation in class and tests of evaluation of abilities and knowledge.

% end-of-term-examination: 50

% of continuous assessment (assigments, laboratory, practicals…): 50

BASIC BIBLIOGRAPHY
- E. H. J. Pallett & Shawn Coyle Automatic Flight Control, Blackwell Science Ltd., 1993

- Editors: Eskandarian, Azim (Ed.) Handbook of Intelligent Vehicles, Springer, 2012

- LOPEZ PITA, ANDRES FERROCARRIL Y AVION EN EL SISTEMA DE TRANSPORTES EUROPEO, UPC, 2001

- Navet N. Automotive embedded systems handbook, CRC Press, 2009

ADDITIONAL BIBLIOGRAPHY
- Bishop, Richard Intelligent vehicle technology and trends, Artech House, 2005

- Bonnett, Clifford F. Practical railway engineering , Imperial College Press, 2005

- Chen, Yaobin; Li, Lingxi Advances in Intelligent Vehicles, Elsevier, 2014

- Lemke K. Embedded security in cars, Springer, 2006

- Roger W. Pratt Flight Control Systems, Loughborough University - Progress in Astronautics and Aeronautics Series, V-184 Published by AIAA, 2000
- Yaobin Chen, Lingxi Li Advances in Intelligent Vehicles, Elsevier, 2014

BASIC ELECTRONIC RESOURCES
- Yaobin Chen and Lingxi Li . Advances in Intelligent Vehicles :
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