

## Vehicle Automation

Academic Year: ( 2023 / 2024 )

Review date: 10-04-2023

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).

## ASSESSMENT SYSTEM

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

<b>% end-of-term-examination:</b>	50
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	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

- . Intelligent Vehicles Enabling Technologies and Future Developments:  
<http://https://www.sciencedirect.com/book/9780128128008/intelligent-vehicles>
- Yaobin Chen and Lingxi Li . Advances in Intelligent Vehicles :  
<http://www.sciencedirect.com/science/book/9780123971999>