

Academic Year: (2024 / 2025)

Review date: 12-03-2024

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: LOPEZ BOADA, BEATRIZ

Type: Electives ECTS Credits : 3.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Machine mechanics.
Vehicle theory.

OBJECTIVES

By the end of this subject, students will be able to have:

1. A systematic understanding of the key aspects and concepts of machine design and testing.
2. The ability to apply their knowledge and understanding to identify, formulate and solve problems of machine design and testing using established methods;
3. The ability to apply their knowledge and understanding to develop and realise mechanical designs to meet defined and specified requirements;
4. An understanding of methodologies in machine design and testing, and an ability to use them.
5. Workshop and laboratory skills in machine design and testing .
6. The ability to combine theory and practice to solve problems of machine design and testing ;
7. An understanding of applicable techniques and methods in machine design and testing , and of their limitations;

DESCRIPTION OF CONTENTS: PROGRAMME

Running gear.
Retardation forces.
Traction and braking.
Lateral train dynamics.
Derailment.
Wheel-Rail contact.
Railway Track.
Mathematical Modelling of track dynamics.
Railway electrification system.

LEARNING ACTIVITIES AND METHODOLOGY

Lectures will be explained in big groups, exercises for understanding the lectures will be solved, labs will be carried out and a project in groups will also be done. In addition, 2 labs will be carried out:

Lab 1: Track design.

Lab 2: Performance calculation of a railway vehicle.

ASSESSMENT SYSTEM

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

The work done by the student will be evaluated by following the Bologna criteria. The continuous evaluation will consist of a written test of half of the subject.

The final evaluation of the ordinary call will consist in taking a written test of the part of the subject not evaluated in the continuous assessment.

The laboratory sessions are obligatory. Do not pass the laboratory sessions will imply to fail the subject.

BASIC BIBLIOGRAPHY

- A. Gauchía, D. Garcia-Pozuleo, B.L. Boada, M.J.L.Boada, E. Olmeda y V. Diaz Automóviles y Ferrocarriles: problemas resueltos, UNED, 2014
- Iwnicki, S. Handbook of railway vehicle dynamics , CRC/Taylor & Francis,, 2006
- V. Diaz, E. Olmeda, A. Gauchía, D. Garcia-Pozuleo, B.L. Boada y M.J.L.Boada Automóviles y Ferrocarriles, UNED, 2012

ADDITIONAL BIBLIOGRAPHY

- Bonnett, Clifford F. Practical railway engineering , Imperial College Press, 2005
- Javier González, Rosario Romera, Jesús Carretero, José M. Pérez Optimal railway infrastructure maintenance and repair policies to manage risk under uncertainty with adaptive control, Working papers. Statistics and Econometrics , 2006