Universidad Zaragoza

29613 - Mechanics

Syllabus Information

Academic Year: 2021/22

Subject: 29613 - Mecánica

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 430 - Bachelor's Degree in Electrical Engineering

ECTS: 6.0

Year: 2

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on active methodologies that favor the development of critical thinking. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, autonomous and group work and assessment tasks.

- In the lectures, the theoretical foundations of the Kinematic and Dynamic Analysis of Multibody 3D Systems will be exposed, and this theoretical knowledge will be applied by the students to model real electromechanical systems.

- In the practice sessions, selected problems will be solved in coordination with the contents taught in the lectures.

- In the laboratory sessions, the student will model the kinematic and dynamic behavior of real electromechanical systems.

- During the course, a series of different activities connected with the development of the will be proposed.

- In the group coursework, the theoretical-practical concepts taught in the lecture and practice sessions will be applied to the real electromechanical systems

4.2. Learning tasks

This is a 6 ECTS course organized as follows:

CLASSROOM WORK: 2.4 ECTS (60 HOURS)

1) Lectures (Type T1) (30 hours).

These kinds of sessions are large group sessions. In these sessions, the teacher will explain the theoretical foundations of the subject.

2) Practice Sessions (Problem Solving Classes) (type T2) (15 hours).

In these sessions, selected problems will be solved by the teacher with the participation of the students. The set of problems to be solved will be coordinated with the theoretical contents taught in the lectures.

3) Laboratory Sessions (type T3) (15 hours).

In these sessions, the student will model the Kinematics and Dynamics behavior of 3D Multibody Mechanical Systems using the Laboratory Sessions Document.

Each student will be graded at the end of each laboratory session.

AUTONOMOUS WORK: 3.6 ECTS (90 HOURS)

4) Courseworks (type T6) (20 hours).

There are two types of activities:

- Proposed activities to be carried out by the students. These activities are connected with the development of different concepts taught during the course.
- Coursework: the topic to be covered by the different coursework groups (3-4 students) will be proposed by the teacher at the beginning of the semester. The student must hand out a written document and they have to make a public presentation of the coursework.

5) Self Study work (Type T7) (66 hours).

This activity includes the time dedicated by students to personal study which includes both the study of the theoretical foundations of the subject and the problem-solving tasks. It will be promoted the continuity of the work of the students by means of a homogeneous distribution of the different learning activities throughout the semester. The tutorials are included in this learning activity. The tutoring sessions are devoted to identify learning problems and to answer questions related to theory, problems, and coursework.

4.3. Syllabus

The course will address the following topics:

Topic 1: Introduction to Mechanics applied to Electrical Engineering.

Topic 2: Particle Kinematics

Topic 3: Kinematics of the Rigid Solid

Topic 4: Kinematics of Rolling without slipping

Topic 5: 3D Mechanical Systems Kinematics

Topic 6: Forces and torques acting in Mechanical Systems

Topic 7: Geometry of Mass

Topic 8:3D Mechanical Systems Dynamics: Vectorial Theorems

Topic 9:3D Kinematic and Dynamic Modelling of Real Electromechanical Systems

4.4. Course planning and calendar

1.-Classroom sessions:

The classroom sessions (lectures, problem-solving sessions, and laboratory sessions) will be taught according to the schedule available in EINA web page and in the platform http://moodle.unizar.es)

2.-Tutorial sessions

The office hours will be available on EINA web page and in http://moodle.unizar.es

3.-Coursework presentation calendar

The coursework presentation scheduling will be available far enough in advance in http://moodle.unizar.es

4.-Complementary activities related to the subject

The additional activities concerning the subject will be planned according to the number of students, the scheduling for these activities will be available for the students far enough in advance in http://moodle.unizar.es

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29613&Identificador=13316