Universidad Zaragoza

Year : 2019/20

28824 - Machines: Calculus and Design

Syllabus Information

Academic Year: 2019/20
Subject: 28824 - Machines: Calculus and Design
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 424 - Bachelor's Degree in Mechatronic Engineering
ECTS: 6.0
Year: 3
Semester: First semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

The aim is to enable the student to design machine elements following the fault criteria, focusing on fatigue fault criteria. In addition, it enables the student to select the ideal materials for element design.

1.2.Context and importance of this course in the degree

The course on Machine Calculation and Design is part of the Degree in Mechatronic Engineering, belonging to the group of subjects that make up the module called Mechanics.

Each course of the degree aims at covering a field in the Technological and Scientific training of the student, in this case, Design and Calculation. Success in this goal means obtaining efficient and safe machines.

1.3.Recommendations to take this course

The progress of the subject requires previous knowledge of Mathematics, Physics Mechanics and Materials Resistance, but having passed other previous subjects is not a compulsory requirement.

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process designed for this subject is based on the following:

- **Lectures**: Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamentals, structuring them in topics and or sections, interrelating them.
- **Practice Sessions**: The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.
- **Individual Tutorials**: Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

4.2.Learning tasks

The course includes the following learning tasks:

The subject will have the following overall distribution:

- 54 hours of lectures, with 20% theoretical demonstration and 80% solving type problems.
- 6 hours of written assessment tests, one hour per test.
- 90 hours of personal study, divided up over the 15 weeks of the 2nd semester.

There is a tutorial calendar timetable set by the teacher that can be requested by the students who want a tutorial.

4.3.Syllabus

The course will address the following topics:

- **Topic 1. Design by Static Resistance**
  - 1.0. Review of straight beams and element design
  - 1.1. Curved Beams
  - 1.2. Beams of variable section
  - 1.3. Contact stress
  - 1.4. Stress Concentrators
  - 1.5. Failure Theories for Static Load
- **Topic 2. Dynamic Resistance Design**
  - 2.1. Dynamic loads
  - 2.2. Design to impact loads
  - 2.3. Fatigue Resistance Design
- **Topic 3. Securing and transmitting elements**
  - 3.1. Gears
  - 3.2. Shafts and trees
  - 3.3. Screws and bolts

4.4.Course planning and calendar

The dates of the final exams will be those that are officially published at http://www.eupla.unizar.es/asuntos-academicos/examenes.

The written assessment tests will be related to the following topics:

? **Test 1**: Topic 1.

? **Test 2**: Topic 2.

? **Test 3**: Topic 3.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28824&year=2019