TEORIA DE MÁQUINAS
(Classes in English)

LEARNING OUTCOMES

Upon successful completion of this course, students will know:

· Techniques of analysis of planar mechanisms

· How to perform the kinematic and dynamic analysis of a planar mechanism

· How to balance a rotor

· How to calculate a flywheel

· Geometry of a gear tooth and its kinematic behavior

· Main characteristics of different types of gears

· How to determine the gear ratio of ordinary and planetary gear trains

· Fundamentals of vibration analysis and the characterization of engineering vibration problems

CONTENTS

PRACTICES

WINMECC PRACTICES

SESSION W1: Kinematic analysis of mechanisms with WinMecC software.

SESSION W2: Dynamic analysis of mechanisms with WinMecC software.

LABORATORY PRACTICES

SESSION P1: Displacement diagram of a slider-crank mechanism.

SESSION P2: Torque diagram of a slider-crank mechanism.

SESSION P3: Balancing of a rotor.

SESSION P4: Gear ratios in a manual gearbox.
Gear ratios in a one-stage and a two-stage planetary gearbox.

GENERAL BIBLIOGRAPHY

- A. Simón, A. Bataller, A. Cabrera, F. Ezquerro, A.J. Guerra, F. Nadal, A. Ortiz, Fundamentals of Machine Theory and Mechanisms. Springer 2016.
- G.H. Martin, Kinematics and Dynamics of Machines. Mc Graw-Hill 1981.
- H. Mabie, C. Reinholtz, Mechanisms and dynamics of machinery. John Wiley and Sons 1987.

EVALUATION PROCEDURE

The evaluation of the course will be carried out according to the following criteria:

First Ordinary Examination Call

As stated in the UMA regulations, the grade of the 1st ordinary call will be based on continuous evaluation. The grade will be weighted according to the following items:

- Class attendance is required. Those students who have more than two absences in each half of the semester cannot pass the subject in the first ordinary call.
- 1st Partial Exam (PEC1): written theoretical-practical exam, whose contents cover the first half of the subject. Its evaluation will be conditioned to class attendance and have satisfactorily completed at least 80% of the evaluation activities "laboratory practices + problems" scheduled prior to its completion. It will take place on the date that will be scheduled at the beginning of the course, within the academic calendar.
- 2nd Partial Exam (PEC2): written theoretical-practical exam, whose contents cover the second half of the subject. The evaluation will be conditioned to class attendance and to have satisfactorily completed at least 80% of the evaluation activities "laboratory practices + problems" corresponding to this period. It will take place on the date scheduled by the Engineering School for the official exam of the 1st ordinary call.

Final grade:
In order to pass the course, the final grade must be equal or higher than 5 points out of 10. The final grade will be calculated according to the following expression 0.5*PEC1 + 0.5*PEC2, being 2 the minimum admissible grade in each Partial Exam to pass the subject. Students who attend any of the Partial Exams will be considered to have attended the 1st ordinary call exam and their grade will appear in the official record of the subject for said call.

Second Ordinary Examination Call

There will be a single theoretical-practical exam that will cover the contents of the complete course and that will be held, once the academic period is over, on the date scheduled by the Engineering School.

Final grade:
The final grade will be the grade obtained in the final exam.
In order to pass the course, the final grade must be equal or higher than 5 points out of 10.

Extraordinary Examination Call

There will be a single theoretical and practical exam to be held at the end of the academic period, on the date set by the Engineering School.

Final grade:
The final grade will be the grade obtained in the final exam.
In order to pass the course, the final grade must be equal to or higher than 5 points out of 10.