

Academic Year: (2019 / 2020)

Review date: 10-02-2020

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: GUTIERREZ MOIZANT, RAMON ALBERTO

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Machine Mechanics
Machine Design

OBJECTIVES

Ability for machine desing
Synthesis of mechanisms
Multibody System Dynamics
Machine simulation to solve kinematic and dynamic problems and modal analysis
Evaluation and control of effects of rigidity, play, crack and deformation in machines
Ability to predict, analyze and control the vibrational response of machines
Advanced test and diagnostic of machine functionality
Ability to analyze and correct surface strain measured through strain gages and photoelasticity.

DESCRIPTION OF CONTENTS: PROGRAMME

Synthesis of mechanisms
Function generating
Path generating
Generalization of spatial mechanism
Non-lineal dynamics of machines
Non-lineal vibrations. Autoexcited vibrations and parametric resonance.
Stochastic and stationary vibrations.
Modal Analysis.
Metrology concepts in mechanical engineering.
Extensometry and fotoelasticity.
Modelling using Finite Element Method

LEARNING ACTIVITIES AND METHODOLOGY

Lectures will be explained in big groups, exercises for understanding the lectures will be solves, labs and PC class will be carried out.

ASSESSMENT SYSTEM

The work done by the student will be evaluated by following the Bologna criteria. The work carried out by each student during the term will be evaluated separately as well as the final exam.

Labs are also part of the evaluation of the subjetc and its execuation is obligaded to pass the subject.

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

BASIC BIBLIOGRAPHY

- Carstensen, Carsten; Wriggers, P The finite element analysis of shells: fundamentals, Springer, 2009
- Erdman, Arthur G. Diseño de mecanismos : análisis y síntesis, Prentice Hall, 1998
- International Academy for Production Engineering, The Metrology, Springer, 2014
- Jonathan Whiteley Finite Element Methods, Springer, 2017
- Norton, Robert L. Diseño de maquinaria : síntesis y análisis de máquinas y mecanismos, McGraw-Hill, 2009

- Zienkiewicz, O.C. El método de los elementos finitos, McGraw-Hill, 1993-1994

ADDITIONAL BIBLIOGRAPHY

- William M. Murray The Bonded Electrical Resistance Strain Gage: An Introduction , Oxford University Press, 1992