

Academic Year: ( 2021 / 2022 )

Review date: 22-05-2021

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: GOMEZ GARCIA, MARIA JESUS

Type: Compulsory ECTS Credits : 4.0

Year : 1 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Mechanical Engineering fundamentals.

**OBJECTIVES**

Diagnosis of mechanical mechanisms using data analysis of mechanical sensors measurements (Matlab).

The student will learn:

- Advanced techniques for mechanical vibration analysis
- Mechanical Systems identification based on data analysis

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction to industrial maintenance and mechanical signals in time and in frequency domain.
2. Signal classification. Introduction to signal processing in Matlab.
3. Spectral Analysis
4. Fourier Methods
5. Vibration signals acquisition
6. Sampling theory.
7. Rotating machinery diagnostic applications
8. Non-linear vibrations

**LEARNING ACTIVITIES AND METHODOLOGY**

Classroom (65% of ETCS) + homework (30% of ETCS) + conferences and seminars (5% of ETCS).

**ASSESSMENT SYSTEM**

Exam (50% of final mark, with a minimum mark of 3/10 points) + group work (40% of final mark) + in-class tests (10% of final mark)

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

- S. BRAUN DISCOVER SIGNAL PROCESSING. An interactive guide for engineers., willey, 2008

**ADDITIONAL BIBLIOGRAPHY**

- John G. Proakis y Dimitris G. Manolakis Digital Signal Processing (4th Edition), Prentice Hall, 2006
- Robert B. Randall Vibration-based Condition Monitoring: Industrial, Aerospace and Automotive Applications, John Wiley & Sons, Ltd, 2010