Experimental techniques in thermal engineering

Academic Year: (2020 / 2021) **Review date: 10-07-2020**

Department assigned to the subject: Thermal and Fluids Engineering Department

Coordinating teacher: GOMEZ HERNANDEZ, JESUS

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

OBJECTIVES

Competences and skills that will be acquired and learning results

- Design a data acquisition system to fit some specific thermal process application.
- Measurement of errors and uncertainty associated to industrial monitoring.
- Identify the most suitable signal analysis methodology to recover information from measured time series.
- Understand the control strategies used in conventional control systems found in industrial thermal processes.
- To characterize a control loop using the dynamic analysis by transient response.

Learning outcome
At the end of the course program the students will be able to design a monitoring and control system to fit a specific industrial or research application within the framework of thermal processes. The design should include the description of the instrumentation to fulfill the minimum data acquisition requirements of the control systems, the control strategy to be used, and the digital signal processing to be applied on the collected signals.

DESCRIPTION OF CONTENTS: PROGRAMME

-Measurement errors and uncertainty
-Data acquisition systems.
-Digital signal processing
-Time series analysis
-Conventional control feedback systems
-Advanced Control systems

LEARNING ACTIVITIES AND METHODOLOGY

- Lectures covering the main topics described within the course program. (1 ECTS)
- Problem solving and case study lectures, where some issues are addressed from a practical point of view (1,5 ECTS).
- Laboratory and practical sessions, where the student can apply the concepts learn and face the monitoring and control solution adopted in real applications. (0.5 ECTS)

ASSESSMENT SYSTEM

Evaluation system considers the continuous evaluation of the student (through reports, lab sessions , ...) and the evaluation through a midterm exam that will evaluate the knowledge of the students. Midterm exam will be held online through Aula Global.

The continuous evaluation percentage is 100%, 30% is due to the Midterm, while a 70% corresponds to the evaluation of reports and guided projects.

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Alan S. Morris and Reza Langari Measurement and Instrumentation. Theory and Application, Elsevier Inc, 2012

- PPL Regtien, F van der Heijden, MJ Korsten and W Olthius Measurement Science for Engineers, Elsevier Ltd, 2004

- Wolfgang Altmann, David Macdonald, and Steve Mackay Practical Process Control for Engineers and Technicians, Elsevier Ltd., 2005