Course guides
220039 - 220039 - Experimental Design

Last modified: 29/05/2020

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 715 - EIO - Department of Statistics and Operations Research.

Degree: BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2020 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Algaba Joaquin, Ines M.

Others: Rivera Fusalba, Oriol

PRIOR SKILLS

To follow the subject it is necessary to have previous notions of statistics for engineers: normal (Gaussian) distribution and probability calculation, hypothesis testing for normal variable, probabilistic plots and regression

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:
2. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

TEACHING METHODOLOGY

The course is divided into parts:
Theory classes
Practical classes
Self-study for doing exercises and activities.
In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.
In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.
Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.
The teachers provide the curriculum and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

The main objective is to capacitate the students to model and optimize the behavior of processes. To this end, they will learn how to design the experimentation and to analyze and interpret the obtained results.

STUDY LOAD

Type	Hours	Percentage
Self study	45,0	60.00
Hours large group	30,0	40.00

Total learning time: 75 h

CONTENTS

Design of experiments

Description:
- Linear Regression
- Two-Level Factorial Designs
- Two-Level Fractional Factorial Designs
- Modelling variability
- Weighted Least Squares
- Sequential Design

Related activities:
Theory classes, practical classes, self-study, evaluation activities

Full-or-part-time: 75h
Theory classes: 30h
Self study : 45h

GRADING SYSTEM

The final grade depends on the following assessment criteria:
- Linear regression project, weight: 20 %
- Classroom deliverable, weight: 30 %
- Exam, weight: 50 %

Any student who cannot attend any of the written tests (classroom deliverable and/or exam) or that wants to improve the obtained grade, will have the opportunity to improve that grade by taking an additional global written exam that will take place the date fixed in the calendar of final exams. The grade obtained in this test will range between 0 and 10, and will replace that of the two written tests in case it is higher.

BIBLIOGRAPHY

Basic:
- Montgomery, Douglas C. Design and analysis of experiments. 8th ed. New York: John Wiley & Sons, 2013. ISBN 9781118097939.

RESOURCES

Other resources:
Material available in ATENEA