

## 220236 - Design of Experiments

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
 Teaching unit: 715 - EIO - Department of Statistics and Operations Research  
 Academic year: 2019  
 Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Optional)  
 ECTS credits: 3 Teaching languages: Catalan

### Teaching staff

Coordinator: Algaba Joaquin, Ines M.  
 Others: Ginebra Molins, Josep

### 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).

Observation: Although the documentation is in Catalan this course might be taught in Spanish, if needed.

### 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 using relevant statistical tools.

### Study load

Total learning time: 75h	Hours large group:	27h	36.00%
	Self study:	48h	64.00%

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### Content

Module 1: Design of Experiments	Learning time: 75h Theory classes: 27h Self study : 48h
Description: <ul style="list-style-type: none"><li>- Linear Regression</li><li>- Two-Level Factorial Designs</li><li>- Two-Level Fractional Factorial Designs</li><li>- Modeling variability</li><li>- Weighted Least Squares</li><li>- Sequential Design</li></ul> Related activities: Theory classes, Practical classes, Self-study, Evaluation Activities.	

### Qualification 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, cop. 2013. ISBN 9781118097939.

Others resources: