

60794 - Data and Models for Engineering

Syllabus Information

Academic Year: 2019/20

Subject: 60794 - Data and Models for Engineering

Faculty / School: 110 -

Degree: 532 - Master's in Industrial Engineering

ECTS: 6.0

Year: 2

Semester: First semester

Subject Type: Optional

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The proposed methodology encourages student continuous work. All sessions are held in the computer lab to enable students to use statistical software. The statistical techniques are illustrated with industrial applications by means of case studies based on real data.

4.2.Learning tasks

The course includes the following learning tasks:

- **Lectures.** Introduction to the statistical techniques, which are illustrated with case studies in computer lab sessions.
- **Computer lab sessions.** Students will analyze data collections from the industrial field by using statistical software.
- **Tutorials.** The teacher's office hours for students to discuss and review the topics presented in class and the assigned tasks.
- **Assignments and autonomous work** (88 hours). Each student will develop several tasks concerning the application of statistical techniques in actual problems drawn from the industrial context.
- **Formative assessment.** Each student should make an oral presentation of 30 minutes focusing on one of the assignments previously done.

4.3.Syllabus

The course will address the following topics:

SECTION 1. DEFINE AND MEASURE PHASES

1. Introduction to Six-Sigma methodology.
2. Descriptive analysis and summary of data.
3. Time to failure models and system reliability.
4. Accelerated life testing.

SECTION 2. ANALYZE PHASE.

1. Simple linear regression model.
2. Regression model building.

SECTION 3. IMPROVE PHASE.

1. The role of the design of experiments to improve quality and to obtain stronger products and industrial processes.
2. Basic principles of the design of experiments.
3. Factorial experiments.

SECTION 4. CONTROL PHASE.

1. In-process inspection as a part of the production process and sampling plans.
2. Capability analysis.
3. Advanced methods for statistical quality control.

4.4.Course planning and calendar

The course is structured in 4 hours per week along the semester. A review of previous knowledge on data analysis is done during the first week.

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

4.5.Bibliography and recommended resources