

Course Unit	Industrial Statistics	Field of study	Mathematics
Master in	Chemical Engineering	School	School of Technology and Management
Academic Year	2019/2020	Year of study	1
Type	Semestral	Semester	2
Level	2-1	ECTS credits	6.0
Code	6362-354-1202-00-19		
Workload (hours)	162	Contact hours	T 30 TP - PL 30 TC - S - E - OT - O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) José Mário Escudeiro de Aguiar

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

- To have an overall view of concepts and techniques most commonly used in Design and Analysis of Experiments.
- It is also expected to understand the contribution of Taguchi to Experimental design and Quality Engineering.

Prerequisites

Before the course unit the learner is expected to be able to:

To apply basic deductive and inductive statistics concepts. To use Excel framework.

Course contents

Design and Analysis of Experiments: Introduction, concepts. Experiments with a single factor: The analysis of variance. Factorial designs: Complete factorial design and fractional factorial design. Yates algorithm. Confounding effects in the 2k factorial design. Randomized Blocks, Latin Squares, and related designs. Taguchi techniques: Basic concepts. Analysis of experimental results.

Course contents (extended version)

- Design and Analysis of Experiments.
 - Introduction, concepts. The analysis of variance. Factorial designs.
 - Experiments with a single factor: Complete factorial design and fractional factorial design.
 - Yates algorithm. Confounding effects in the 2k factorial design.
 - Randomized Blocks,
 - Latin Squares, and related designs.
 - Taguchi techniques: Basic concepts. Analysis of experimental results.

Recommended reading

1. Douglas C. Montgomery, "Design and Analysis of Experiments", John Wiley & Sons, 2001, ISBN 0-471-31649-0.
2. I. D. Hill, "An Introduction to Sampling Inspection", The Institute of Quality Assurance, London, ISBN 0-906810-04-3.
3. G. Taguchi, S. Konishi, "Taguchi Methods: design of experiments", ASI Press, 1993, ISBN 0-941243-18-4.
4. R. C. Guimarães, J. A. S. Cabral, "Estatística", McGraw-Hill, 1998.

Teaching and learning methods

The concepts and techniques are presented to the students supported in real life examples. The students must solve practical problems using computer programs.

Assessment methods

- Option 1 - (Regular, Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100%
- Option 2 - (Regular, Student Worker) (Final, Supplementary)
 - Intermediate Written Test - 50%
 - Final Written Exam - 50%

Language of instruction

English

Electronic validation

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03-03-2020	04-03-2020	27-03-2020	27-03-2020