Course guide
240230 - 240AU104 - Quality Management

Last modified: 15/05/2020

Unit in charge:	Barcelona School of Industrial Engineering
Teaching unit:	715 - EIO - Department of Statistics and Operations Research.

Degree: MASTER'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2019). (Optional subject).

Academic year: 2019 **ECTS Credits:** 4.5 **Languages:** Spanish

LECTURER

Coordinating lecturer: JAVIER TORT-MARTORELL LLABRES

Others: Pere Grma Cintas
Mar Costa Vaghi

PRIOR SKILLS

Basic knowledge of statistics

TEACHING METHODOLOGY

Three methodologies will be used:
· Expository and participatory classes
· Cooperative learning
· Problem-based learning

LEARNING OBJECTIVES OF THE SUBJECT

It is expected that the student is able to apply (design and implement) both technical and organizational aspects of quality management, quality control and quality improvement.
Specifically, at the end of the course students will be able to:
. Understand the main quality standards related to the sector
. Design a quality procedure
. Understand the importance of quality improvement systems and design and organize Six Sigma or Lean systems applying the relevant techniques
. Making capabilty studies to characterize the variability of a process. Use control charts (SPC)
• Use simple factorial designs
• Work together to agree on decisions and solve problems together

STUDY LOAD

Type	Hours	Percentage
Hours medium group	27,0	24.00
Self study	72,0	64.00
Hours small group	13,5	12.00

Total learning time: 112.5 h

CONTENTS

Quality management and improvement

Description:
Introduction to Total Quality. Historical Background. The quality gurus. Juran's trilogy.
Methodologies for improvement. Six Sigma: organization required. Project and team selection. Steps to follow: Define, Measure, Analyze, Improve and Control. Lean Methodologies. The seven wastes. The continuous flow.
Quality standards in the automotive sector: ISO / TS 16949

Specific objectives:
Understand and be able to argue and convince of the need for improvement systems. Be able to apply the DMAIC (Six Sigma) methodology to simple projects. Knowing how to identify wastes according to the Lean methodology and identify appropriate tools to remove them.

Full-or-part-time: 14h
Theory classes: 10h
Practical classes: 4h

Statistical tools for quality

Description:
Strategies to combat variability. Statistical Process Control: How and why. Control charts for variables: Xbar-R charts. Other control charts for variables. Control charts for attributes: P, NP. Others attribute control charts

What is sampling inspection? What is a sampling plan? Buyer and seller's risks. Calculation of risks. Characteristic of a sampling plan. Design of sampling plans. MIL-STD 105 D

Basic techniques of Design of Experiments, full factorial designs: Calculation and analysis of the significance of effects. Interpretation of results. Introduction to fractional factorial designs and robust product design (G. Taguchi contributions)

Specific objectives:
Be able to identify the appropriate control chart to each situation and to use them to identify assignable causes. Be able to design, conduct and analyze full factorial experiments. Knowing how to critically evaluate sampling inspection systems and use the concepts of buyer and seller risks

Full-or-part-time: 21h
Theory classes: 14h
Practical classes: 7h

Other tools for quality

Description:
Ishikawa's seven basic tools: templates, histograms, Pareto charts, cause-effect diagrams, scatterplots, stratification, control charts. Skills: team work
Anticipating the appearance of defects: Failure Mode and Effects Analysis (FMEA). Voice of the Customer. The Kano model. QFD: Quality house. Foolproof systems: Poka-Yoke. 5S

Specific objectives:
Be able to identify the right tool to different situations and to use them in specific cases

Full-or-part-time: 10h
Theory classes: 6h
Practical classes: 4h

GRADING SYSTEM

During the spring semester of the 2019-2020 academic year, and as a consequence of the health crisis due to Covid19, the qualification method will be the same that was planned:

NF = 0.30 * NAC + 0.25 * NEP + 0.45 * NEF

NF: final grade

NAC: Continuous Assessment grade

NEP: mid term exam grade