

Unidade Curricular: Control Methods and Quality Management

Área Científica: EG

Duração: Semestral

Horas de trabalho: 121.5

Horas de contacto: 45

ECTS: 4.5

Docente Responsável: Isabel Maria da Silva João

Learning outcomes of the curricular unit

1. Know how to identify and discuss the different approaches to the concept of quality.
2. Understand the historical evolution of quality management systems
3. Know how to characterize the various dimensions of quality of service.
4. Know how to use service quality and customer satisfaction measurement models.
5. Identify the requirements of the different quality management tools.
6. Understand the methods and philosophy of statistical process control.
7. Understand the statistical basis of the control charts.
8. Know how to set up and use the control charts for variables and for attributes.
9. Implement the statistical process control
10. Investigate and analyse process capability.
11. Know how to conduct and analyse a measurement systems capability experiment (R&R).
12. Know how to design a sampling plan and how to use plans, schemes and sampling systems, with special emphasis in lot by lot acceptance sampling for attributes.

Syllabus

1. Historical evolution of quality. The different approaches to the concept of quality.
2. Quality Management and evolution of ISO 9000 series standards.
3. Quality of service assessment models. Relationship between quality and customer satisfaction. Measurement of quality and customer satisfaction. Quality management and customer satisfaction.
4. The basic quality tools and the quality management tools.
5. Statistical basis of the control chart. Control charts for variables. Control charts for short production runs. Control Charts for attributes.
6. Statistical process control. Process capability analysis. Repeatability and reproducibility of the measurement system.
7. Acceptance sampling. Lot-by-lot acceptance sampling for attributes. Types of sampling plans. Lot formation and random sampling. Single sampling plans for attributes. The OC curve. Designing a single sampling plan with a specified OC curve.
MIL STD 105E, ANSI/ASQCZ1.4, ISO 2859.

Demonstration of the syllabus coherence with the curricular unit's learning objectives.

The curricular unit of control methods and quality management provides a comprehensive coverage of statistical methods and other problem solving techniques for quality control and improvement. Those methods constitute an aid to problems resolution, improvement of the effectiveness and efficiency of the processes and support business decisions. The curricular

unit also covers the quality management systems, its establishment, documentation, implementation and its contribution to enhance customer satisfaction. The knowledge, skills and competencies to be achieved by students are directly related to the syllabus by attending the respective classes and subsequent evaluation.

Teaching methodologies (including evaluation)

Teaching methodologies:

Expositive methodologies to explore concepts and theory. Active methodologies involving the active participation of the students in the resolution of the problems or case studies in order to explore some issues related to know how to do and how to apply the theoretical knowledge acquired.

The continuous evaluation includes a group practical work where the capacity of research and summarizing is explored along with the capacity of knowing how to do, as well as an individual global test with the duration length of 1.5 hours where the acquired knowledge is explored. The evaluation by exam is made by a final written exam with the length of 2.5 hours.

Continuous evaluation:

A Global Test (GT): $GT \geq 9.5$

A practical work (PW): $PW \geq 9.5$

Formula to obtain the final grade (FG):

$$FG = 0.4 PW + 0.6GT$$

$FG \geq 9.5$ in a scale 0-20 in order to obtain approval.

Final exam evaluation:

Final Exam (FE): $FE \geq 9.5$

$FG = FE \geq 9.5$ in a scale 0-20 in order to obtain approval

Demonstration of the coherence between the teaching methodologies and the learning outcomes

The learning outcomes of the curricular unit control methods and quality management are reached by the use of expositive methodologies as well as active methodologies. The syllabus is lectured by the presentation of slides made by the responsible of the curricular unit. The slides are previously made available to the students allowing them to better follow the lectures and take notes considered to be relevant. In the more expositive classes the participation of the students is encouraged by the questioning procedure and exploration of topics as a way to promote the interaction between students and teacher. The students are also encouraged to search for information such as books, scientific and technical papers, via web of science or b-on as well as the information of national or international standards used in quality control and quality management to provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer's requirements, and that quality is consistently improved. The resolution of problems and case studies is also very important allowing the students to put into practice the theoretical concepts. In the continuous evaluation the students carry out in group a practical work to explore and summarize a topic from the area of quality where the technical and scientific correctness are evaluated as well as the students ability to explore and summarize the information to present as a paper. The teaching methodologies allow students to acquire the knowledge on topics of quality control and quality management to provide support for the quality improvement of organizations towards excellence.

Mandatory consultation/existence bibliography:

1. Montgomery, D.C, Introduction to Statistical Quality Control, John Wiley & Sons, 5th ed., New York, 2005.
2. Lindsay, M.J., Evans, R.J., The Management and Control of Quality, 6th ed., Thomson South-Western, 2005.
3. Kenneth S. Stephen., The handbook of applied acceptance sampling: plans, principles, and procedures. ASQ Quality Press, 2001.
4. Coelho, P. M. P. S., & Vilares, M. J. (2011). A Satisfação e Lealdade do Cliente: Metodologias de Gestão, Avaliação e Análise. (2ª ed.) Lisboa: Escolar Editora.
5. Thomas P. Ryan, Statistical methods for quality improvement. John Wiley & Sons, 2000.