

25851 - Quality engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	271 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS	5.0
Course	
Period	Second Four-month period
Subject Type	Optional
Module	---

1. Basic info

1.1. Recommendations to take this course

It is advisable to have studied the core subject " Manufacturing Processes "

1.2. Activities and key dates for the course

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The key dates of the course are marked by case studies, practices, evaluations etc. They are detailed in section planning and scheduling.

2. Initiation

2.1. Learning outcomes that define the subject

The student, for passing this subject, should demonstrate the following results ...

It is able to apply techniques of control, assurance and quality management of products and processes throughout their life cycle, including: design and implement a system control product quality, evaluate and rank suppliers with quality criteria , document and implement phases of review, verification and validation of industrial product design, audit products and apply tools for improving the quality of processes and products.

It is able to identify the needs of standardization and certification of products as well as the legal requirements for product safety and assess their compliance.

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It is able to document a system of quality management applicable to a production company standardized according to ISO 9001 or other international reference, as well as to document similarly integrated management systems and document quality management systems quality for testing or calibration laboratories.

It is able to plan and deploy quality management objectives

It is able to audit quality management systems and processes documented in them.

2.2.Introduction

Brief presentation of the subject

This course aims to provide students with an overview of the techniques of quality management applied to control the process and products throughout their life cycle and techniques of assurance of product safety in service.

The use of quality management techniques is essential to ensure the efficiency of industrial production processes, which has resulted in the implementation and improvement of management systems quality standard, widespread in the industrial environment. These systems pursue the fulfillment of product requirements (including customer requirements and regulatory requirements applicable) in order to make viable its presence in the market.

3.Context and competences

3.1.Goals

The subject and its expected results meet the following approaches and objectives:

The implementation of standardized management systems, widespread Quality, aims to optimize the strategic, productive and support processes required throughout the product life-cycle management. Management techniques and continuous quality improvement, a key part of the contents of the subject, are required especially for the optimization of the design phase and new product development, justifying its presence in the degree.

3.2.Context and meaning of the subject in the degree

The subject of "Engineering Quality and Product Safety" relates to the projective subjects that form the backbone of the degree, responding to their specific requirements of quality and safety, as well as with the compulsory subject "Process manufacturing".

Moreover, it is an optional subject framed within intensification "business management design". Within this intensification it has clear relations with the rest of electives in the same subjects and even includes in its contents integrated management of quality and R & D in the company.

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The theme of this course complements the subject "Approval and certification of products" corresponding to the same intensification, which deals with the technical and legal specifications of a product and the documentation process designed to provide assurance of conformity.

In parallel, it is also related to the subject "Concurrent Engineering and PLM" corresponding to the same intensification. In this subject, it is intended that the student is able to perform a systematic approach to product design, in a integrated way integrated and concurrently with related processes, including manufacture and support, considering all activities of the product life-cycle management.

3.3.Competences

Students will be more competent to ...

- 1) Apply techniques of control, assurance and quality management of products and processes throughout their life cycle.
- 2) Documenting a quality management system.
- 3) Plan and deploy quality management objectives.
- 4) Documenting and implement phases of review, verification and validation of the design of industrial products.
- 5) Evaluate and rank suppliers with quality criteria.
- 6) Design and implement a product quality management system
- 7) Audit quality management systems and processes documented in them.
- 8) Audit products.
- 9) Identify needs of standardization and certification of products.
- 10) Identify legal requirements for product safety and assess their compliance.
- 11) Apply tools to improve the quality of processes and products.
- 12) Document integrated management systems.

There will also be acquired generic skills such as:

- 1) Basic knowledge of the profession.

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- 2) Ability to organize and plan.
- 3) Ability to manage information.
- 4) Capacity for analysis and synthesis.
- 5) Ability to apply knowledge into practice.
- 6) Decision making.
- 7) Ability of oral and written communication.
- 8) Ability to acquire an ethical commitment.
- 9) Concern for quality and improvement

3.4.Importance of learning outcomes

The use of quality management techniques is essential to ensure the efficiency and safety of industrial production processes and products they generate. For the future engineer it is highly desirable to have knowledge and skills related to quality management (which is present in many industrial areas today) as well as integrated management and social responsibility and ethics that business activity entails.

It is an optional subject that the student will take in 3rd or 4th, so it has already acquired (or is acquiring) training in manufacturing processes, with which it complements. In addition, this course enables students to integrate knowledge acquired in prior subjects such as reliability, life time (in statistics), etc. and it allows to get a clear business view of them.

4.Evaluation

The student must prove that he/she has achieved the intended learning outcomes through the following evaluation activities:

- 1: Continuous assessment by performing works or case studies in groups of 2 or 3 people. 70% of the final grade

It is required to pass continuous assessment to pass the subject.

In the section Planning and scheduling different case studies and practices are scheduled.

- 2: Theoretical exam: 30% of the final grade

It will assess key aspects of the subject that have not been evaluated by performing continuous work

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It is mandatory to pass the final theoretical exam to pass the course.

3: Overall assessment.

Following the rules of the University of Zaragoza in this regard, in the subjects they have systems continuously or gradual assessment, also it schedules a test overall assessment for students who decide to opt for this second system. This test will consist of a similar theoretical examination of paragraph 2, with a relative weight of 30% of the final grade, and a case similar to those raised during the course, with a relative weight of 70% of the final grade.

5.Activities and resources

5.1.General methodological presentation

The learning process designed for this subject is based on the following:

The proposed methodology seeks to promote the continued work of the student and focuses on the practical aspects of Quality Engineering.

In sessions with the whole group the more theoretical aspects are addressed in the form of master class and are completed with immediate applications: trouble-type. Information processing control, assurance and quality management by students is carried out in the laboratory sessions where you will learn to apply various techniques and tools simulating a real case.

Both classroom sessions and lab will equip the student knowledge and skills to perform different case studies. These cases have been raised so that each group of students will apply throughout the course different techniques aligned with quality throughout the life cycle of a different product allocated to each group at the beginning of the course.

The evaluation is focused on the more practical aspects. It aims to promote both teamwork and individual effort and has made planning for the hours of dedication balanced in each week.

5.2.Learning activities

The program offered to the student to help he/she to achieve the expected results includes the following activities ...

Type 1 + 2 (in traditional classroom whole group):

Module I: systems quality management and preventive tools. (14 h)

* T1: Introduction. Justification of quality. Basic concepts. (1 hour)

* T2: Quality Management Systems (7 h)

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* T3: Quality in product characteristics planning (3 h)

* T4: Quality in design and product development and process (3 h)

Practical cases

Module II: Quality auditing, certification and product safety (10 h)

* T5: Management systems audit (3 h)

* T6: Process Audit (1 h)

* T7: Product Audit (1 h)

* T8: Standardization and product certification (2 h)

* T9: Product Safety (3 h)

Practical cases

Module III: Integrated management systems (3 h)

* T10: Integration of Quality Management Systems (1 h).

* T11: Integration of Quality, Environment, Occupational Health and Safety, Corporate Social Responsibility and Research, Development and Innovation Management Systems. (2 h).

Practical cases

Module IV: Continuous Improvement and Management Systems costs (3 h)

* T12: Continuous improvement tools (2 h).

* T13 Management Systems Cost (1 h).

Practical cases

Final theoretical exam

Type 3 (laboratory or computer room and in small groups)

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Module I: Quality management systems and preventive tools. (6 h)

Module II: Quality auditing, certification and product safety (6 h)

Module III: Integrated Management (3h)

Module IV: Continuous Improvement and Management Systems costs (6 h)

5.3.Program

Module I: systems quality management and preventive tools.

- * T1: Introduction. Justification of quality. Basic concepts.
- * T2: Quality Management Systems
- * T3: Quality in product characteristics planning.
- * T4: Quality in design and product development and process.

Module II: Quality auditing, certification and product safety

- * T5: Management systems audit.
- * T6: Process Audit.
- * T7: Product Audit.
- * T8: Standardization and product certification.
- * T9: Product Safety.

Module III: Integrated management systems.

- * T10: Integration of Quality Management Systems.
- * T11: Integration of Quality, Environment, Occupational Health and Safety, Corporate Social Responsibility and Research, Development and Innovation Management Systems.

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Module IV: Continuous Improvement and Management Systems costs

* T12: Continuous improvement tools.

* T13: Management Systems Cost.

5.4.Planning and scheduling

5 ECTS credits: 125 hours / student distributed as follows:

- * 30 h. Lectures (15 sessions): Type 1 + 2
- * 21 h. Practice (7 sessions): Type 3
- * 25 h. Personal study
- * 45 h. Practical work
- * 4 h. Examination and presentation of case studies

Planning for weeks detailing type of activity:

Week	Type 1+2	Type 3	Practices	Personal Study	Examination and presentation of case studies	Total
1	2			2		4
2	2	3	4	2		11
3	2	3		1		6
4	2		1	1		4
5	2	3	4	2		11
6	2		4	2		8
7	2		4	1		7
8	2	3	4	2		11
9	2		4	2		8

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10	2		4	2		8
11	2	3		2		7
12	2		4	1		7
13	2		4	2		8
14	2	3	4	2		11
15	2	3	4	1	4	14

5.5.Bibliography and recommended resources

Bibliography:

- Course notes "Engineering quality and product safety".

Reference books:

- Manual management and quality engineering. Pfeifer, T. Torres, F. Mira Editores.2002
- Manual of Quality Control. Juran, Gryna and Bringham. Editorial Reverté. Barcelona, 1983
- Comprehensive management of quality. Implementation, monitoring and certification. Cuatrecasas, Lluís. Editions Management 2000 2005.
- The audit of quality management systems. Vilar, J. Editorial Fundacion Confemetal. Madrid, 1999.
- Product liability for defective products. Fundamentals and application. Marco Molina, J. Publisher Atelier, 2007.-
- Directive 2001/95 / EC of the European Parliament and the Council of 3 December 2001 on general product safety [Official Journal L 11 of 15.1.2002].