

Academic Year/course: 2021/22

## 29748 - Industrial Quality

### Syllabus Information

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**Academic Year:** 2021/22

**Subject:** 29748 - Industrial Quality

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 434 - Bachelor's Degree in Mechanical Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

This course focuses on interpreting industrial needs in the field of industrial quality so that students are able to provide adequate and optimal solutions, both from an organizational and technical point of view, to problems related to control, assurance and quality management in the company.

These approaches and objectives are aligned with some of the Sustainable Development Goals, SDG, of the 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) and certain specific goals, in such a way that the acquisition of the Learning outcomes of the subject provides training and competence to the student to contribute to some extent to their achievement:

- Agenda 2030 and SDGs in a broad spectrum, given that one of the subjects of the subject is Social Responsibility, which explains, among other things, the SDGs and places special emphasis on how Industrial Quality can help achieve the SDGs. indicated. It is evaluated in the examination of the subject.
- Goal 12: Ensure sustainable consumption and production patterns
  - Target 12.4: Achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

### 1.2. Context and importance of this course in the degree

This course is offered in the Industrial Technologies Engineering Degree (intensification of Integrated Production) and in the Mechanical Engineering Degree (intensification of Manufacturing Engineering).

In both degrees, compulsory subjects are taught that raise the fundamental knowledge around Production, laying the foundations for the design and development of product manufacturing processes according to design specifications and within the requirements of quality, costs and deadlines. delivery, as well as the equipment (systems) to carry out these processes according to different levels of automation and flexibility.

In the intensifications in which this subject is framed, the necessary knowledge related to Manufacturing is deepened. This subject, "Industrial Quality", aims to offer solid training in relation to the needs of the industrial environment in relation to quality control, assurance and management. With this approach, the aim is to train students so that they are able to interpret the needs in the three areas and provide solutions to them, both from a technical, organizational and management point of view.

### 1.3. Recommendations to take this course

This course does not have prerequisites, but it is recommended that the student have passed the Manufacturing Technologies subjects.

## 2. Learning goals

### 2.1. Competences

**Specific skills:**

C41: Ability to define and implement quality control systems applied to products and manufacturing processes, including metrological control systems.

**Generic skills:**

C4: Ability to solve problems and make decisions with initiative, creativity and critical reasoning.

C6: Ability to use the engineering techniques, skills and tools necessary to practice it.

C9: Capacity for information management, handling and application of the technical specifications and legislation necessary for the practice of Engineering.

## 2.2. Learning goals

The student, to pass this course, must demonstrate the following results:

- Applies techniques of control, assurance, quality management, total quality and continuous improvement of products and processes throughout its life cycle.
- Identifies product standardization and certification needs, as well as legal product safety requirements and assess their compliance.
- Knows and documents a quality management system applicable to a production company, standardized according to ISO 9001 or other international benchmarks (EFQM, and others), as well as documents similarly integrated management systems and quality management systems of industrial laboratories of testing / calibration.
- Plans and deploys quality management objectives and undertakes audits of quality management systems and the processes documented in them.
- Knows and selects appropriate inspection and verification methods (including statistical process control, experiment design, reliability, etc.) based on criteria such as the manufacturing system used or the quality objectives established.

## 2.3. Importance of learning goals

In the face of continuous technological development and the growing globalization of markets, the industrial sector must continually increase its productivity and innovation. In companies in the productive sector, this increase inevitably involves manufacturing better and cheaper (with fewer failures, fewer unexpected machine stops, etc.).

For this reason, the techniques and systems that ensure quality are an important tool to achieve these levels of productivity since they allow control and maintenance not to be simple final stages or attached to the manufacturing process, but rather to be integrated within it. In this way, it is also possible to increase the profitability of the process by detecting possible manufacturing errors when it has not yet been completed, allowing the necessary corrections to be applied in the process, as well as reducing the cost caused by said errors. Furthermore, an adequate company management system results in its optimal operation.

This course allows the student to integrate knowledge acquired in previous subjects, as well as obtain a clear industrial vision of them.

## 3. Assessment (1st and 2nd call)

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

**Gradual evaluation.** It is divided into two blocks:

Block 1:

Written tests consisting of solving theoretical-practical questions and problems related to the subject taught. It represents 30% of the final grade and a grade higher than 4.0 must be obtained (between 0 and 10) to average with the second block.

Block 2:

To evaluate the applied and practical contents of the subject, students have planned to prepare a set of works related to the theoretical sessions, problems and practices, in which they will solve the cases presented based on the tools learned.

The criteria for evaluating these works will be: delivery of reports in a timely manner, adequate content, good approach, extraction of interesting conclusions and good presentation.

To pass the subject and demonstrate that the student has achieved the expected learning results, the grade obtained in the assignments must be equal to or greater than 4.0. The grade will be from 0 to 10 and will represent 70% of the final grade.

The grade of the subject will be obtained from the weighted average of the two blocks, being necessary to pass a value equal to or greater than 5.0. The results obtained in the passed tests will be kept until the end of the academic year.

**Global evaluation.**

In case of not passing any of the blocks of the gradual evaluation, the student may take the global evaluation to which he is entitled, in either of the two calls, which will consist of an exam that includes both blocks of the gradual evaluation, with the same scheme of distribution of points and minimum marks. This examination will take place on the dates indicated in the examination calendar prepared by the School.

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

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

A lecturing program based on 30 hours of lectures, 12 hours of problems, 15 hours of laboratory sessions and company visits or workshops, as well as the fulfillment of a practical Project (60 hours). The project will be carried out either individually or in groups of 3 or 4 students.

The practical sessions in the laboratory will last 2,5 hours each, one day every two weeks approximately. As in the theoretical lectures, students will be provided with the guide for practical work good in advance.

Both the sessions in the classroom and in the laboratory will provide the student with knowledge and skills to carry out different practical cases. These will be given to the students for them to apply different techniques learned in class to a specific real case decided at the beginning of the course.

The evaluation is centered on practical aspects. Teamwork and individual effort will be encouraged. The course has been planned for the student to have a balanced load of work every week.

### 4.2. Learning tasks

Attendance at all learning activities is especially relevant to acquire the skills of the subject.

- Master classes
- Problem sessions
- Laboratory practices
- Visits to companies
- Tutored works
- Study and personal work

### 4.3. Syllabus

#### Contents

1. EFQM Model
2. Quality Management System ISO9000
3. Environmental, Health and safety management systems
4. Social Accountability
5. Lean
6. Purchasing Quality
7. Reliability

#### Laboratory sessions

- Self assessment according to the EFQM model
- Quality Management System
- Lean / Quality tools
- Purchasing Quality / Reliability
- Company visits

### 4.4. Course planning and calendar

All the theoretical, practical and laboratory sessions will take place according to the schedule and calendar provided by the Escuela de Ingeniería y Arquitectura, which are available on its web site (<http://eina.unizar.es>)

### 4.5. Bibliography and recommended resources

The updated bibliography can be found at the UZ Recommended Bibliography [link](#).