Degree competences to which the subject contributes

Specific:
2. Develop and present a research proposal according to the criteria of the international scientific community.

General:
1. Ability to effectively communicate their findings, knowledge and concluding reasons to skilled and unskilled audiences, clearly and unambiguously.

Teaching methodology

The course is divided into three parts:
- Sessions of content explanation
- Practice sessions
- Authonomous work on exercises and activities

In the content explanation sessions the teachers will convey to the students the fundamentals of the techniques of quantitative data analysis, together with examples of applications in industrial engineering research.
In the practice sessions the students will learn to use the tools (i.e., software) of quantitative data analysis through examples of research in industrial engineering.
In the authonomous work sessions students will work on exercises of application of similar difficulty than the ones introduced in the practical sessions.

Learning objectives of the subject

The course of quantitative research methods introduces students to the concepts, principles and fundamentals of scientific research with quantitative data in industrial engineering, presenting the fundamentals of the data analysis techniques, and the use of quantitative data analysis tools.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group: 8h</th>
<th>10.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total learning time:</td>
<td>Hours medium group:</td>
<td>3h</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>16h</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>48h</td>
</tr>
</tbody>
</table>
## Content

### Module 1: Fundamentals of quantitative data analysis

**Description:**
- Introduction
- Research design with quantitative data
- Sampling techniques
- Data analysis techniques: factor analysis, linear regression, structural equation models

**Related activities:**
- Exercices
- Exam

**Learning time:** 36h
- Theory classes: 12h
- Self study : 24h

### Module 2: Tools for quantitative data analysis

**Description:**
- Introduction to quantitative data analysis software R
- Linear models and generalized linear models with R
- Factor analysis with R
- Structural equation models with R

**Related activities:**
- Exercices
- Exam

**Learning time:** 39h
- Theory classes: 12h
- Guided activities: 3h
- Self study : 24h

## Qualification system

The grade is obtained through three assignments, weighting 20% each, and an exam with a weight of 40%. The exam will be taken the last day of class. Students with nonsatisfactory results on the exam can enhance their grade by doing another exam on the date where the final exam is scheduled. Final grade will be calculated with the best score on the two exams the students have taken. All students can take the second exam.

## Regulations for carrying out activities

El final y los ejercicios serán individuales.

## Bibliography