

66431 - Design and Development in Precision Engineering

Syllabus Information

Academic year: 2023/24

Subject: 66431 - Design and Development in Precision Engineering

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 536 - Master's in Mechanical Engineering

ECTS: 4.5

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

Objectives of the subject

The main objective of the subject is for the students to acquire the necessary skills for the application of specialized techniques to the design and development of manufacturing and measurement systems according to precision engineering principles. Different levels are addressed: design and development of precision systems, techniques for the manufacture and measurement of products with special characteristics (large dimensions, complex geometries, etc) and experimental techniques for the verification of manufacturing and measurement systems.

Firstly, it is intended that the student assimilates the appropriate work methodologies, to later advance in the optimization of the problems that arise in the design and development tasks of the different systems and products. Specialized computer techniques and applications will be used, while reviewing the state of the art in the industry and research. Each student will delve into a specific line of work, although they will be able to observe the application in the rest of the work lines by participating in the analysis of technical cases and the work of the rest of their colleagues.

Sustainable Development Goals of the 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) : Goal 9: Objectives 9.4 and 9.5

2. Learning results

1. To acquire the practical skills for the application of experimental techniques for the control and verification of manufacturing systems to specific cases.
2. To acquire skills to design and optimize manufacturing systems as well as inspection and verification equipment.
3. To know and apply computational and experimental techniques for the development of solutions in mechanical manufacturing.
4. To know the optimization techniques applied to manufacturing and measurement systems.

3. Syllabus

Topics

1. Design, development and optimization of manufacturing and measurement systems according to precision engineering principles.
 - Technical case of precision equipment design.
2. Design, manufacture and measurement of products with special features.
 - Technical case of manufacturing and measuring large dimension products and/or complex geometries.
3. Verification of manufacturing and measurement systems.
 - Technical case of modelling, identification and volumetric verification of machine tool.

4. Academic activities

- Master Class (9 hours)
- Technical cases (12 hours)
- Practical sessions: (12 hours)
- Tutored development (10 hours) The tutored practices will be used for the evaluation, correction, and clarification of aspects of the subject project carried out by each student, with the aim of analysing possible deficiencies and solving doubts to improve personal work.
- Assessment (2 hours). Presentation of works
- Student's personal work (90 hours)

5. Assessment system

The subject is preferably evaluated with a **continuous assessment** that consists of two blocks:

1. Practical work/project that includes its presentation and defence (75% of the grade).
2. Reports on practices and case studies proposed to the student (25% of the grade).

Alternatively, the student has the possibility of passing the subject by means of the **global evaluation** in the official calls for exams. In this case, the evaluation will be carried out through a practical test on the dates set by the centre.