66431 - Design and Development in Precision Engineering

Información del Plan Docente

Academic Year	2017/18
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

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on the understanding of the application of experimental and optimization techniques in the different areas of design and development of special characteristics products together with manufacturing and measurement systems from the perspective of precision engineering.

To accomplish these objectives, a wide range of teaching and learning tasks are implemented, such as:

- Lectures, in which the different theoretical contents will be explained.
- Case studies and the different kind of tools and techniques will be introduced through problems and laboratory sessions.
- A project will be carried out at the end of the course with the assistance of different instructors specialized in every field taught in the course.

5.2.Learning tasks

The course (4.5 ECTS: 112.5 hours) includes the following learning tasks:

- **Lectures** (9 hours). The different theoretical contents will be explained.
- **Practice sessions of case studies** (12 hours). Development of technical cases that will enhance the acquisition and understanding of the theoretical knowledge as well as the learning of the tools and techniques needed for the development of the projects.
- **Laboratory sessions** (12 hours). Development of technical cases that will enhance the acquisition and understanding of the theoretical knowledge as well as the learning of the tools and techniques needed for the development of the projects.
- **Tutorials** (10 hours). Tutored sessions will contribute to the evaluation, correction and clarification of aspects related to the student's project, in order to analyse the possible shortcomings and answer questions to improve the work.
- **Oral presentations** (2 hours).
- **Project** (67.5 hours). Autonomous work and related tasks.

5.3.Syllabus

The course will address the following topics:

Topic 1. Design, development and optimization of measuring and manufacturing systems according to precision engineering principles.

- Technical case study: design of a precision equipment.

Topic 2. Design, manufacturing and measuring of products with singular characteristics.

- Technical case study: manufacturing and measuring of parts with large dimensions and/or complex geometries.

Topic 3. Verification of manufacturing and metrology systems.

- Technical case study: machine-tool modelling, parameter identification and volumetric verification.

5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

5.5.Bibliography and recommended resources

The following resources are recommended:

- Lecture notes and problems
- Laboratory sessions documentation

This information can be complemented with the following bibliography:

BB Pfeifer, Tilo . Production Metrology /

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	Pfeifer, Tilo. Oldenboourg: De Gruyter, 2002
BB	Slocum, Alexander H.. Precision machine design / Alexander H. Slocum Dearborn (Michigan) : Society of Manufacturing Engineers, cop. 1992
BC	Coordinate measuring machines and Systems / Bosch, J., ed. Marcel Dekker, 1995
BC	Creus Solé, Antonio. Instrumentación industrial / Antonio Creus Solé . - 8ª ed. Barcelona : Marcombo, 2011