

66431 - Design and Development in Precision Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	536 - Master's in Mechanical Engineering
ECTS	4.5
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

Learning 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. All of that from the perspective of the principles of precision engineering. The case study method will be used for all of them, and the student should focus his subject project in one of those areas.

To accomplish these objectives, the different theoretical concepts will be explained during the lectures. Technical case studies and the different kind of tools and techniques involved will be introduced through problems and laboratory sessions. Last part of the course will be devoted to carry out the subject project with the assistance of different instructors

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specialized in every field.

5.2.Learning activities

Learning activities scheduled are divided into lectures, technical cases sessions, laboratory sessions, and different works related with the development of the subject project.

All the theoretical concepts related with the subject will be developed during the lectures.

The problem and laboratory sessions will be aimed to the development of technical cases that will enhance the acquisition and understanding of the theoretical knowledge and the learning of the tools and techniques needed for the development of the projects.

Tutored sessions will contribute to the evaluation, correction and clarification of aspects related with the student's project, in order to analyse the possible shortcomings and answer questions to improve the work.

5.3.Program

1. Design, development and optimization of measuring and manufacturing systems according to precision engineering principles.
 - Technical case study: design of a precision equipment.
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.
3. Verification of manufacturing and metrology systems.
 - Technical case study: machine-tool modelling, parameter identification and volumetric verification.

5.4.Planning and scheduling

Lectures, problems, laboratory sessions and official exams schedule will be defined by the EINA (schedules are available in EINA web page).

All the information concerning the schedule of the subject projects will be notified to students in advance.

Globally, the subject will be distributed in the following way:

4.5 ECTS credits: 112.5 hours / student

- 9 h lectures
- 12 h technical cases
- 12 h laboratory sessions
- 10 h tutored sessions
- 2 h Oral report presentations
- 67.5 h Individual work.

5.5.Bibliography and recommended resources

The following resources are recommended:

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- Lectures notes and problems
- Laboratory sessions documentation

This information can be complemented with the following bibliography:

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| BB | Pfeifer, Tilo . Production Metrology / 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 |