25873 - Mechanism Design

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	558 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS	6.0
Course	2
Period	First semester
Subject Type	Compulsory
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

BASIC COMPETENCES

CB01. Students have demonstrated knowledge and understanding in a field of study that is part of the general secondary education curricular, and is typically at a level which, although it is supported by advanced textbooks, includes some aspects that involve knowledge of the forefront of their field of study.

CB02. Students can apply their knowledge to their work or vocation in a professional manner and have competences typically demonstrated through devising and defending arguments and solving problems within their field of study.

CB03. Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include an important reflection on social, scientific or ethical issues.

CB04. Students can communicate information, ideas, problems and solutions to both specialist and non-specialist

audiences.

CB05. Students have developed those skills needed to undertake further studies with a high degree of autonomy.

GENERAL COMPETENCES

GC01. Able to acquire basic knowledge of the profession of industrial design, to combine that generalist knowledge and expertise with those who generate innovative and competitive proposals.

GC02. Ability to analyze and assess social and environmental impact of technical solutions, acting with ethics, professional responsibility and social commitment.

GC03. Ability to design and develop design projects in aspects related to the nature of products and services, their relevance to the market, usage environments and user, and based on their manufacture, the selection of materials and processes most appropriate in each case considering relevant aspects such as quality and product improvement.

GC04. Ability to organize time effectively and coordinate activities to acquire new knowledge quickly and perform under pressure.

GC05. Capacity to collect, manage, analyze and synthesize information from various sources for the development of design projects and product development. Capacity to use this documentation to obtain conclusions aimed at solving problems and making decisions with initiative, creativity and critical thinking, in order to generate new product concepts, new ideas and solutions.

GC06. Ability to generate the necessary documentation for the proper transmission of ideas through graphics, reports and technical documents, models and prototypes, oral presentations in Spanish and other languages.

GC07. Ability to use and master techniques, skills, tools and techniques and communication and others specific of design engineering needed for design practice.

GC08. Ability to learn continuously, to develop autonomous learning strategies and to work in multidisciplinary groups with motivation and determination to achieve goals.

GC09. Knowing the industries, organizations, regulations and procedures and other elements to be considered in industrial design projects.

GC10. Ability to plan, budget, organize, direct and control tasks, people and resources.

SPECIFIC COMPETENCES

SC09. Knowledge of the principles of the theory of machines and mechanisms.

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3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The knowledge process will be developped by means of master classes, problems solving, practical sessions, and mentored working with an increasing involvement of the student.

- During master classes, basic concepts will be developped and some model exercises will be solved in order to clarify these concepts.
- Problem solving classes are the efficient complement to master classes because they let verify the subject comprenhension and contribute to develop a more engineering profile for the student.
- During Practical sessions, students work with software and workshop equipment in reduced groups. A deeper knowledge of the theoretical concepts is possible as well as the adquisition of new ones. The practical focus and the participation of the students is very important for the development of practical sessions, encouraging students inititative and group working.
- Mentored working is a complement of the rest of methodology means.

5.2.Learning activities

Mechanism design is a compulsory subject of 6 ECTS equivalent to 150 student working hours dividen into:

1. Master classes T1 (30 h)
2. Problems solving and study cases T1 (15 h).
3. Practical sessions T3 (15 h).
4. Mentored working T6 (50 hours non-face group working). Several tasks will be proposed by the teachers.
5. Personal studying (36 h non-face). Continuous personal studying is recomended during all the semester.
6. Exam (4 h).

5.3.Program

A brief description of the theoretical concepts are described below:

- Kinematic analysis of mechanisms
- Cam design and kinematics
- Gears
- Dinamic analysis of mechanisms
- Introduction to mechanisms sinthesys
- Assisted mechanism analysis and design

During practical sessions, working with real mechanisms will be carried out in order to understand concepts explained in theoretical sessions. The most suitable kind of mechanism for a specific purpose will be determined. There will be a brief of the practical session and, if required, the student should give to the teacher a deliverable of the practical session.

Mentored works related to design and analysis of a mechanism will be mentored by the teacher.

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5.4.Planning and scheduling

An schedule for master clasess, problem solving clasess and practical sessions will be deliver before the beginning of the academic course and it could be consulted in the EINA website.

The rest of activities will be planned during the year and students will be informed an advance.

5.5.Bibliography and recomended resources

Recommended bibliography will be included by EINA Library and it will be able to be consulted by web. Relevant bibliography is the following:

- MABIE, H. y OCVIRK, F.; Mecanismos y Dinámica de Maquinaria; Ed. Limusa.
- ERDMAN.; Diseño de Mecanismos; Ed. Mc Graw Hill.
- CALERO, Roque; CARTA, José Antonio; Fundamentos de Mecanismos y Máquinas para Ingenieros; Ed. Mc Graw Hill.
- JAVIERRE C. y FERNÁNDEZ A.; Criterios de diseño mecánico en tecnologías industriales, Prensas Univesitarias de Zaragoza (Textos docentes 208).
- CASTANY J, FERNÁNDEZ A., SERRALLER F.; Análisis de la funcionalidad de los elementos de máquinas, Prensas Univesitarias de Zaragoza (Textos docentes 74).