

## 66434 - Advanced mechanical CAD

### Syllabus Information

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**Academic Year:** 2020/21

**Subject:** 66434 - Advanced mechanical CAD

**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.Aims of the course

#### 1.2.Context and importance of this course in the degree

#### 1.3.Recommendations to take this course

### 2.Learning goals

#### 2.1.Competences

#### 2.2.Learning goals

#### 2.3.Importance of learning goals

### 3.Assessment (1st and 2nd call)

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

### 4.Methodology, learning tasks, syllabus and resources

#### 4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on the understanding of the methodologies used to work with CAD/CAM software and the development of some different mechanical machines and manufacturing fixtures. A wide range of teaching and learning tasks are implemented, such as technical case studies, lectures, autonomous work, laboratory sessions, tasks, projects, and tutorials.

#### 4.2.Learning tasks

The learning activities are divided into: master classes, practical classes and tutoring of some projects.

**Laboratory sessions.** They will be used to solve practical exercises and technical cases, and to develop and apply these methodologies to a concrete case that sometimes must be completed with some autonomous work. Students will use some commercial software with student license to work at home and to develop diverse task and the

**Projects.** There are three individual projects about topics. They will be supervised by the teachers and it is where students will apply the CAD/CAM methodologies.

#### 4.3.Syllabus

The course will address the following topics:

1. 3D modelling techniques to design mechanical structural and aesthetic components:
  1. Parametric solid modelling

2. Synchronous modelling
3. Surface modelling
2. Design and development of mechanical assemblies:
  1. Parameterization and associativity
  2. Verification
  3. Use of library elements
  4. Design of commercial metal structures
  5. Specific component design modules
3. Design of forming tools and CAM
  1. 3D CAD design methodologies for forming tools for plastic and sheet metal components: molds and dies
  2. 3D CAD design methodologies of tools for welding, assembly, machining, inspection positions
  3. CAMD (computer aided mold design): Specific applications for the design of forming tools (molds, matrices) and EDM electrodes
  4. CAM (computer aided machining): Work methodology for milling plate-type parts and components that require surface machining.
4. Generative design and reverse engineering
  1. Generative Design and Concurrent Modeling
  2. Introduction of measurement and data acquisition systems to obtain point clouds.
  3. Fundamentals of Reverse Engineering
  4. Treatment of point clouds for obtaining STL meshes and surface CAD files
  5. Systems of inspection of point clouds and meshes against CAD
  6. Introduction to CAD tools for repair and editing of STL files.

#### **4.4.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.

The learning sessions are three hours in a row per week.

#### **4.5.Bibliography and recommended resources**