



FICHA TÉCNICA DE LA ASIGNATURA

Datos de la asignatura	
Nombre completo	Optativa Complementaria. 3D Engineering Design with Dynamic Simulation
Código	DIM-OPT-436
Título	Grado en Ingeniería Electromecánica por la Universidad Pontificia Comillas
Impartido en	Grado en Ingeniería Electromecánica [Cuarto Curso] Grado en Ingeniería Electromecánica (itinerario internacional) [Cuarto Curso] Grado en Ingeniería Telemática [Cuarto Curso] Grado en Ingeniería Telemática (itinerario internacional) [Cuarto Curso] Grado en Ingeniería en Tecnologías Industriales [Cuarto Curso] Grado en Ingeniería en Tecnologías de Telecomunicación [Cuarto Curso]
Nivel	Reglada Grado Europeo
Cuatrimestre	Semestral
Créditos	3,0 ECTS
Carácter	Optativa (Grado)
Departamento / Área	Departamento de Ingeniería Mecánica

Datos del profesorado	
Profesor	
Nombre	Raquel María Lorente Pedreille
Departamento / Área	Departamento de Ingeniería Mecánica
Correo electrónico	rmlorente@icai.comillas.edu

DATOS ESPECÍFICOS DE LA ASIGNATURA

Contextualización de la asignatura
Aportación al perfil profesional de la titulación
<p>At the end of the course, the student will make technical drawings and to design 3D systems with Solidworks, to test them against real world conditions in order to ensure the best design before building it, and to validate them.</p> <p>Students who successfully complete this course will be able to:</p> <ul style="list-style-type: none">• develop strategies to analyze the dynamics of particles and rigid bodies• apply the laws of dynamics to analyze and interpret the dynamics of particles and rigid



bodies

Prerequisitos

Basics on technical drawing.

Elemental dynamics.

Competencias - Objetivos

Competencias

CG3. Knowledge on basic and technological matters that help the learning of new method and theories. Student will be trained to be flexible in front of new challenges.

CG4. Ability to solve new problems, make decisions, be creative, critical reasoning and to communicate knowledge and skills inside the Industrial Engineering field.

BLOQUES TEMÁTICOS Y CONTENIDOS

Contenidos – Bloques Temáticos

THEME 1: Essentials on part designing

Unit 1: SolidWorks Basics and the User Interface

Design Intent

File References

Opening Files

The SolidWorks User Interface

Using the Command Manager

Unit 2: Introduction to Sketching

2D Sketching

Sketch Entities

Design Intent

Sketch Relations

Dimensions



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

**GUÍA DOCENTE
2019 - 2020**

Extrude

Unit 3: Basic Part Modeling

Terminology

Choosing the Best Profile

Choosing the Sketch Plane

Details of the Part

Boss Feature

Sketching on a Planar Face

Cut Feature

View Selector

Using the Hole Wizard

Filleting

Detailing Basics

Drawing Views

Center Marks

Dimensioning

Changing Parameters

Unit 4: Symmetry and Draft

Symmetry in the Sketch

Sketching Inside the Model

Using Model Edges in a Sketch

Creating Trimmed Sketch Geometry

Unit 5: Patterning

Reference Geometry

Linear Pattern

Circular Patterns

Mirror Patterns

Using Pattern Seed Only

Sketch Driven Patterns



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

**GUÍA DOCENTE
2019 - 2020**

Unit 6: Revolved Features

Revolved Features

Building the Rim

Building the Spoke

Edit Material

Mass Properties

Unit 7: Shelling and Ribs

Analyzing and Adding Draft

Shelling

Planes

Ribs Full Round Fillets Thin Features

THEME 2: Essentials on assembly designing

Fundamentals on Assemblies

Advanced Mate Techniques

Top-Down Assembly Modeling

Assembly Features, Smart Fasteners, and Smart Components

Using Configurations with Assemblies

Display States and Appearances

Assembly Editing

Layout-based Assembly Design

Large Assemblies

THEME 3: Dynamical and kinematic behaviour of systems with Solidworks

Unit 1: Introduction to user interface

Constraint mapping concepts

Action only forces and moments

Action/Reaction forces and moments

Motion drivers



Building models for kinematic analysis

Create displacement, velocity, acceleration and force graphics

Translatory and torsional springs

Translatory and torsional dampers

3D Contact to simulate realistic interaction between parts

Impact forces

Using Function builder and Expressions to build complex motions and forces

Flexible connectors - Bushings

Unit 2: Advance topics

Kinematic and Dynamic analysis

Redundancies - Importance and how to avoid/solve them

Export of results to SolidWorks Simulation (stress analysis)

METODOLOGÍA DOCENTE

Aspectos metodológicos generales de la asignatura

Both In-class and distance teaching are developed to imply the students within the learning activities. The subjects are developed to keep the student attention and following the competencies acquisition by the students. Student activities are key factors to develop this course.

In-class methodology: Activities

1. Life presentations. The teacher will explain basic concepts for every theme showing the more important aspects. Examples will be presented, discussed and solved to complete the understanding.
2. In class case discussion and problem solving. Students will discuss the cases and problems proposed by the teacher. Cases will be open challenges that can be analyzed and solved by the use of the concepts already presented in class.



Distance Methodology: Activities

1. Self-learning on the concepts presented in class. Material to be used are slides, multimedia files, personal and teacher notes, recommended books and magazines. 2. Cases study. To be revised and updated with the rest of information given in the subject. Main target of the distance Works is to be able to understand theoretical concepts and to be able to apply them.

EVALUACIÓN Y CRITERIOS DE CALIFICACIÓN

Evaluation activities Criteria Weight

Tests::

- Mid term exam.
- End of term exam

- Concepts understanding. - Use of concepts to solve real cases. - Problem solving solution analysis and results interpretation. - Presentation. 60%

Continuous evaluation.:

- Case solving - Concepts understanding. - Concepts use to solve real cases. 40

Calificaciones

The grade will be determined by midterm (15%), homework (10%), continuous evaluation (30%), and a final examination (45%). The exams are all closed notebook, closed textbook and no calculator. The course will not be graded on a curve, i.e., there is no bound on the numbers of A's, B's, C's etc.

PLAN DE TRABAJO Y CRONOGRAMA

Actividades	Fecha de realización	Fecha de entrega
Distance Activities Do Date Delivery date · Reading of multimedia files to be showed in class		



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

**GUÍA DOCENTE
2019 - 2020**

(Slides) Before lesson

- Study on the slides showed in class. After lesson
- Study with additional information coming from other sources: Hand written notes, books, etc. After lesson
- Case solving In class
- Solved problema understanding. In class
- Presentation, cases, problems preparation as part of continuous scoring. After lesson
- Mid-term and final exam preparation. February and May

BIBLIOGRAFÍA Y RECURSOS

Bibliografía Básica

Resource Center at Dassault Systemes web.

En cumplimiento de la normativa vigente en materia de **protección de datos de carácter personal**, le informamos y recordamos que puede consultar los aspectos relativos a privacidad y protección de datos [que ha aceptado en su matrícula](#) entrando en esta web y pulsando "descargar"

[https://servicios.upcomillas.es/sedelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792](https://servicios.upcomillas.es/sedeelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792)