ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA

DIM-OPT-436 3D Engineering Design with Dynamic Simulation

SEMESTER: Spring

CREDITS: 3 ECTS (2 hrs. per week)

LANGUAGE: English

DEGREES: IEM

Course overview

This course will give to the student the skills to develop strategies to analyze the dynamics of particles and rigid bodies. The course will be focused on making technical drawing and designing 3D systems with SolidWorks, testing them against real world conditions in order to ensure the best design before the manufacturing.

Prerequisites

Basic technical drawing. Elemental dynamics..

Course contents

1. Essentials on part designing. SolidWorks Basics and the User Interface. Introduction to Sketching. Basic Part Modeling. Symmetry and Draft. Patterning. Revolved Features. Shelling and Ribs.
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
3. Dynamical and kinematic behavior of systems with SolidWorks (I). 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.
4. Dynamical and kinematic behavior of systems with SolidWorks (II). Advance topics: Kinematic and Dynamic analysis. Redundancies - Importance and how to avoid/solve them. Export of results to SolidWorks Simulation (stress analysis).

Textbook

- Resource Centre at Dassault Systems website.

Grading

The overall grade is obtained as follows:

- Final exam 40%.
- Mid-term exam 20%.
- Continuous evaluation 40%. It includes class exercises and homework.