CAD using Solid Edge. Resolution of assemblies based on PBL methodology

Description of the lecture:

CAD (Computer Aided Design) is an easy and accurate tool to generate databases of objects, based on Technical Engineering Drawing.

Traditionally, the design has been performed in 2D. CAD is based in a parametric 3D modelling methodology, which modifies the traditional design system. CAD tools, besides changing the methodology also enable and encourage teamwork.

New technologies and tools are developed and introduced to the industry daily. Therefore, from the point of view of the industry, professionals with advanced knowledge in new technologies such as CAD programs are required.

Lately, CAD programs are being included in CAE (Computer Aided Engineering) and CAM (Computer Aided manufacturing) systems, becoming an important tool in the automation of industrial processes. In this regard, it is essential for an engineer to have good skills in CAD software programs.

Overall, the main objectives of this field of study are the following:

- The use of the technical engineering drawing in order to develop and understand technological projects.
- The development of a methodology in the area of the industrial design, based on the knowledge of technical engineering drawing.
- Application of CAD tools to virtual prototypes and to their technical drawing.

The skills obtained will be following:

- Interpretation of standardized technical drawings in industrial engineering by means of new technology tools for the communication between professionals.
- The application of spatial intelligence in the industrial design to solve specific requirements with creativity.
- Development of strategies to face and solve graphical problems in engineering projects.
- The use of the computer as quick and accurate tool.

The Index that will be followed in this lecture:

1- Introduction to CAD systems. Structure and analysis of the software. Applications.

2- Introduction to Solid Edge. Working interfaces. Tutorials.

3- Design process. Scheduling of the product and the tasks. Design of the concepts. Design of the assembly. Accurate design.

4- Definition of the assembly. Types. Selection of an assembly for the analysis.

4.1- Scheduling of the product and the tasks. In this section the specific needs are analysed and information is collected. A first idea of the product is required. The result of this task is a list containing all the needs.

4.2- Design of the concepts. This phase requires exploring basic issues, detailing the functional structure, choosing an appropriate working structure and developing a major result. The result of this task is the definition of the assembly, including its parts which will be defined in drafts.

4.3- Design of the assembly. The work is based on the design of the concept. In this task the design of the concept is deepened and a system that fulfils all the technical and economical requirements is proposed. The assembly proposed in this task enables the demonstration of its functionality and spatial compatibility.

4.4- Accurate design. Virtual prototyping, manufacturing technical drawings and the final details are defined. The mechanism defined in the phase of design of the concepts is developed in the CAD program, as well as verified by assembling its parts. This task is finished by illustrating the assembly by animation.

4.5- Matrix to validate the results. At the end of the activity the quality of work can be evaluated using clear and precise criteria.

Observations:

This subject was published in 2013 in Spanish "CAD con Solid Edge. Resolución de conjuntos basado en PBL " and in Basque "CAD Solid Edge-ekin. PBL-n oinarritutako multzoen ebazpena" in 2015. Going a step further, the aim is to publish the subject in the international language, English. This action will enable student from foreign Universities to join the course and in addition will improve the skills of our students by broadening their knowledge to other languages.

The course will follow PBL (project based learning) methodology, in fact, the opposite methodology to the traditional one. First of all a problem is presented, then the needs are identified and finally the required information to solve the problem is detected.

Although this subject is presented as an alternative auto-learning methodology it is recommended to perform it in small working teams.