

Computer Aided Drawing and Design (CADD)

- 1. Course number and name:** 020CAOES2 Computer Aided Drawing and Design (CADD)
- 2. Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours per week
- 3. Name(s) of instructor(s) or course coordinator(s):** Elie Bou Chakra

Instructional Materials: Professor textbook and course material.

4. Specific course information

a. Catalog description:

This course seeks to expose students to computer aided drawing and design (CADD), they will be taught how to employ these powerful tools in the solution of various mechanical engineering problems. CADD includes all the modeling programs and techniques that allows the design of models and products. It also makes possible to simulate and therefore virtually test products before manufacturing them so that it is then easy to transmit the information to Computer Aided Manufacturing (CAM). The course will also help students to identify several stages: (a) Creation of a model of the object, (b) Analysis, testing and simulations, (c) Construction of virtual prototypes, (d) Management of large assemblies. It utilizes SolidWorks software for drawing, analysis, design, and testing of mechanical systems and applications.

b. Prerequisite: None.

c. Required for ME students.

5. Educational objectives for the course

a. Specific outcomes of instruction:

A student who successfully fulfills the course requirements will have demonstrated an ability to:

- Use a computer-aided design system (SolidWorks).
- Learn to visualize in 3D and design parts in 3D.
- Acquire knowledge of mechanical components in order to be able to integrate them into the assembly carried out.
- Understand the operation and use of mechanical transmission systems.
- Analyze and simulate the constraints that act on the object or system designed.
- Solve engineering problems using drawing.
- Create virtual prototypes, carry out technical analysis and carry out the simulations necessary for the success of the prototype.

b. PI addressed by the course:

PI	1.1	1.2	1.3	7.1	7.2
Covered	x	x	x	x	x
Assessed	x	x	x	x	x

6. Brief list of topics to be covered

- **Chapter 1: Introduction to CAD:** Introduction – Definition of CAD – Advantages, Phases of the design process – Applications and examples – Principles of CAD – Industrial process – Precautions – Analysis & simulations. (1 Lecture).
- **Chapter 2: Introduction to SolidWorks Software:** Definition – Operation – Basic concepts – Associated products and file extensions. (4 Lectures).
- **Chapter 3: Applications and Exercises:** Stage of creating a 3D part. (4 Lectures).
- **Chapter 4: Introduction to Manufacturing Processes:** Manufacturing processes by material removal – Manufacturing processes by adding material – Manufacturing processes by deformation of materials – Manufacturing processes from the liquid state – Manufacturing processes from powder. (1 Lecture).
- **Chapter 5: Design of Parts While Considering the Manufacturing Process + mini design project.** (4 Lectures).
- **Chapter 6: Stresses and Motion Simulations of Parts on SolidWorks.** (4 Lectures).
- **Chapter 7: Assembly of Mechanical Systems:** Welded assemblies – Riveted assemblies – Threads – Screw – Nuts – Elastic rings – Couplings – Bolts and studs – Support washers – Pins – Locking of screws and nuts – Shaft – Hub connection – Applications and exercises. (4 Lectures).
- **Chapter 8: Mechanical Transmission Systems:** Motors – Cylinders – Plain bearings – Bearings – Gears – Chains – Belts, etc. (2 Lectures).
- **Chapter 9: Assembly of the Mechanical Parts, Tolerances and Necessary Constraints for the Assembly + project.** (4 Lectures).