

# Course memo 2021

## **MG2128 - Not Just CAD, extended course (MG2028 - Not Just CAD)**

### *CAD and Other IT Tools in Industrial Processes*

#### **Background**

Today, manufacturing companies face fierce international competition, where new products have to be developed and produced at an ever-increasing pace. Thus, productivity in the product realization process is of uttermost importance. Companies form joint ventures and cooperate with subcontractors and consultants in order to speed up their work. To facilitate such sharing of work tasks, the use of IT tools, such as CAD, CAM, CAE and PDM systems is becoming a necessity. However, in order to fully utilize such tools, well-structured and efficient sharing and exchange of information between the different companies and their software systems are necessary.

In this course, you will learn more about the IT tools used by mechanical engineers, and how information should be created and re-used in a well-structured manner during design, analysis and manufacturing of products.

#### **Learning Outcome for MG2128/Prerequisite for MG2028**

After passing the course MG2128/before entering the course MG2028, you should be able to:

- ✓ create basic CAD models (in Solid Edge or another similar CAD system) in a structured manner:
  - parameterized solid models of parts
  - assembly models of products containing part models
  - mechanism models and animations
  - simple drawings of parts with dimensioned orthographic, detail and section views
  - assembly drawings with parts lists and exploded views

#### **Learning Outcomes (Common for MG2028 & MG2128)**

After passing the course, you should be able to:

- ✓ in a modern CAD system, create robust models, that could easily be understood and further developed by others
- ✓ use CAD models:
  - in a CAM system for creating a simple process plan for a part model, and build and use a machine tool model for simulation of the manufacturing process
  - in a product configuration system integrated with a CAD system, build and use a configuration model
  - (in a FEM program carry out a simple finite element analysis and simulation of the manufacturing of a part)
- ✓ adapt a CAD model for additive manufacturing and use it in preparation for manufacturing in a given additive manufacturing machine
- ✓ independently and in own words reason about:
  - how product and production information is handled in manufacturing companies, and how they use IT tools in their product realization processes
  - opportunities and problems regarding information handling in an industrial product realization process

- ✓ create and exchange information about a product and its manufacturing by:
  - using CAD system functionality in a structured manner, to communicate CAD related data
  - using common exchange formats for product data exchange between different information handling software systems

## Course Structure

Following an introductory part, where 3D CAD skills are assured and developed, the course is divided into five different subtasks, each focusing on one type of IT tool used by mechanical engineers in manufacturing industry. Each of these tasks are dealt with during approximately one week, including at least one introductory lecture or one lecture dealing with industrial aspects and one supervised computer laboratory exercise. In addition to this basic computer exercise, the students can opt to take one further, more advanced, non-supervised exercise for some of these topics.

Much of the work during the course is hands-on, working with the different software packages, both in computer exercises and homework assignments, in our department's computer labs in rooms M221 & M226.

**Introductory CAD:** Only for MG2128, prerequisite for MG2028.

**Robust CAD:** Lectures and hands-on exercises introducing functionality and following up on exercises. Two mandatory homework exercises.

**Preliminary tasks** (not always all of these and not necessarily in this order):

- Product configuration, combining configuration and CAD system.
- Production planning, CAM and other systems for offline programming of machine tools and robots
- FEM or other CAE (Computer Aided Engineering) systems.
- Product data exchange; standards for representing, sharing and exchanging product data.
- Additive manufacturing.
- Computer aided metrology.
- CAD model quality.

## Prerequisites

Knowledge about product design and production corresponding to a bachelor degree.

## Compensatory support for students with disabilities during examination

For students with disabilities who have a statement from KTH's FUNKA unit on recommended support during examination, the following applies in this course:

- All support under code R (i.e. adjustments relating to space, time and physical circumstances) are granted without special decision by the examiner
- Support under code P (educational adaptation) must be actively granted or rejected by the examiner after contact has been made by the student in accordance with KTH's rules. Normally, support actions under code P will also be approved.

## Contact

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## **Literature**

Videos and pdf documents downloadable through the Canvas course room- lectures notes, articles, exercises etc., published in Canvas throughout the course.

## **Examination and Requirements for Final Grade**

See separate document *Course Requirements 2021.pdf*