

COURSE SYLLABUS

Mechanical Design and Parametric CAD, 7.5 credits*Konstruktion och parametrisk CAD, 7,5 högskolepoäng*

Course Code:	T1KOPC	Education Cycle:	First-cycle level
Confirmed:	Feb 23, 2026	Disciplinary domain:	Technology
Valid From:	Jan 18, 2027	Subject group:	Mechanical Engineering
		Specialised in:	G1F First cycle, has less than 60 credits in first-cycle course/s as entry requirements
		Main field of study:	Mechanical Engineering

Intended Learning Outcomes (ILO)

On completion of the course the student shall:

Knowledge and Understanding

- demonstrate comprehension of theory around CAD modeling, mechanical design methodology, manufacturing and eco-design from a technical perspective for engineering tasks
- display knowledge of rules and standards related to mechanical drawings and how geometric tolerances are used in industrial contexts
- display knowledge of software used in industrial contexts for the creation of parametric solid models, parametric surface models or parametric hybrid models

Skills and Abilities

- demonstrate skills of application of CAD modeling and mechanical design methodology depending on manufacturing aspects, industrial application and eco-design
- demonstrate the ability to model, parameterize and control CAD models for the creation of solid models, surface models or hybrid models
- demonstrate ability to handle Boolean operations modeling or inside-outside methodology when modeling products
- demonstrate the ability to create proper mechanical part drawings in 2D based on 3D models in terms of line types, view placement, parting lines, dimensions, dimensional tolerances and to specify these with geometric tolerances, as well as a bill of materials with balloons on assembly drawings
- demonstrate the ability to create dimensions as well as geometric tolerances directly in 3D models
- demonstrate the ability to design and dimension products from an eco-design perspective and to use simulation methods to evaluate dimensioning, in project form

Content

Course participants will develop new and previous knowledge in mechanical design and manufacturing aspects to work more correctly with mechanical design methodology and CAD modeling according to design guidelines. The course aims to provide a better understanding of CAD, mechanical design, manufacturing, eco-design, dimensioning and simulation with an industrial application perspective. The course also focuses on mechanical drawings where this is deepened and applied in a CAD environment in both 2D and 3D. The course also introduces methods for controlling models parametrically.

The course includes the following elements:

- Theory of mechanical design methodology, 3D CAD, manufacturing and mechanical drawings as well as theory of eco-design
- CAD modeling theory such as Design by features, Bottom-up modeling / Top-down modeling

- Use of CAD modeling software for; solid modeling, surface modeling and hybrid modeling with an eco-design perspective in project form
- Inside-outside modeling methodology with Boolean Operations
- Mechanical designing and dimensioning of industrial products and using simulation methods to evaluate dimensioning
- The parameter structure and control of the CAD model
- Mechanical drawings, drawing standards and drawings from an industrial perspective
- Different types of view placement, sections, detail views, dimensioning and their consequences for important functional dimensions
- Geometric tolerances (and dimensional tolerances) including reference systems and associated concepts and symbols
- Differences between product drawing, assembly drawing, part drawing, machining drawing and drawings for measurement purposes
- Creation of mechanical design documents in the form of 2D drawings and directly in 3D models, including geometric tolerances (and dimensional tolerances)

Type of Instruction

Teaching takes the form of lectures and computer laborations.

Language of instruction is English.

Entry Requirements

General entry requirements and taken courses in Product Development and CAD, 7,5 credits, Machine Elements, 7,5 credits and Manufacturing Technology, 7,5 credits (or the equivalent).

Examination and Grades

The course is graded 5, 4, 3 or U.

Registration of examination:

Name of the Test	Value	Grading
Project ^{1 2}	4 credits	5/4/3/U
Examination ³	1.5 credits	G/U
Assignment ⁴	2 credits	G/U

¹ Determines the final grade of the course, which is issued only when all course units have been passed.

² The project is done individually.

³ Mini-exams are done individually.

⁴ Assignments are done individually.

Course Literature

Please note that the course literature may be revised up to eight weeks before the start of the course.

Luttorp, Conrad & Brohammer, Göran (2014), *EcoDesign Roadmap*. Studentlitteratur. ISBN 978-91-44-10100-2

Lundkvist, Bo (1997), *Ritsteknik*. Liber. ISBN 9789147011230

McMahon, C & Browne, J (1998), *CAD/CAM Principles, Practice and Manufacturing Management*. Addison-Wesley. ISBN: 9780201178197

Tutorials for the software used in the exercises and other material is posted on Canvas.