Faculty of Health, Science and Technology
Mechanical Engineering

# Syllabus

## Machine design II

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| **Course Code:** | MSGC43 |
| **Course Title:** | Machine design II<br>*Konstruktionsteknik II* |
| **Credits:** | 7.5 |
| **Degree Level:** | Undergraduate level |
| **Progressive Specialisation:** | First cycle, has at least 60 credits in first-cycle course/s as entry requirements (G2F) |

**Major Field of Study:**
MTA (Mechanical Engineering)

**Course Approval**
The syllabus was approved by the Faculty of Health, Science and Technology 2025-01-29, and is valid from the Spring semester 2026 at Karlstad University.

**Prerequisites**
Registered for courses in Machine Design, 7.5 ECTS credits, or equivalent

**Learning Outcomes**
The aim of the course is for students to acquire in-depth knowledge of mechanical engineering design in the areas of design methodology, engineering design, solid modelling, and drawing production.

Design methodology
Upon completion of the course, students should be able to:
- relate theoretical knowledge and the development of a product to a product development process,
- reflect upon the relation between form, material, and the manufacturing process,
- apply common design support methods,
- independently structure, plan, and perform a complex design task, including choice of materials, product form, and manufacturing method, on the basis of a given requirement specification,
- choose and dimension relevant machine components in a machine construction, and
- use sketching to present design solutions.

Engineering design
Upon completion of the course, students should be able to:
- describe the engineering and scientific basics that must normally be taken into account in engineering design,
- use theory and methodology to dimension simple load-bearing mechanical constructions and machine elements, and
- dimension and design simple load-bearing mechanical constructions resistant to mechanical fracture, plastic deformation, and instability such as buckling and collapse.

Solid modelling/drawing production
Upon completion of the course, students should be able to:
- produce 2D drawings of complex details and assemblies in a 3D CAD program,
- model and edit complex parts and assemblies in a 3D CAD program, and
- model and edit parts and assemblies in the advanced modules of a 3D CAD program.

**Content**
Basic knowledge of the course components is provided through lectures, literature, and supervised exercises in solid modelling and drawing in a 3D CAD application. This knowledge is then applied in individual solid modelling

assignments focused on design methodology and CAD, a dimensioning assignment completed in groups and focused on engineering design and the relationship between form, material, and manufacturing, and one or several design assignments completed in groups. The design assignments are followed up in regular meetings for which students hand in parts of their work. Solutions developed by groups of students are presented and discussed orally, including theoretical assessment, and in written reports structured in accordance with instructions.

**Reading List**
See separate document.

**Examination**
Assessment is based on individual hand-in assignments, hand-in assignments completed in groups, seminars, and a written exam.

Submissions for assessment must clearly indicate individual contributions.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

**Grades**
One of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), or U (Fail) is awarded in the examination of the course.

**Quality Assurance**
Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

**Course Certificate**
A course certificate will be provided upon request.

**Additional information**
The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.