



Programme Syllabus

Study Programme in Mechanical Engineering

Programme Code:	TGHMT
Programme Title:	Study Programme in Mechanical Engineering <i>Högskoleingenjörsprogrammet i maskinteknik</i>
Credits:	180
Programme Approval:	The programme syllabus was approved by the Faculty Board of Health, Science and Technology on 1 February 2024, effective from the autumn semester of 2024.
Language of Instruction:	Swedish and English
Education Cycle:	First (Bachelor's level)
Degree Type:	Professional
Degree Title:	Degree of Bachelor of Science in Mechanical Engineering
Entry Requirements:	General entry requirements and Physics 2, Chemistry 1, Mathematics 3c/Mathematics D

Introduction

Mechanical engineering is a broad subject area with applications in virtually all areas where devices, machines and technical systems are created and used. The programme aims to prepare students for professional work as an engineer in the field of mechanical engineering, such as designing products and mechanical details, planning production or machine maintenance, or developing technology and processes used in manufacturing. Engineers often work in teams with other professionals.

The students learn how to develop a professional and agile approach to systematically address various problems. Students will acquire professional knowledge and skills based on research and proven experience that will provide them with a competitive edge. The courses included in the programme comprise elements of practical applications and laboratory exercises to a great extent. Being able to interpret results, reflect, discuss and present ideas, as well as being able to present arguments for one's own solutions, are essential components of the programme.

Authentic project assignments are important elements in the applied courses, and several of the courses include collaboration with external companies or organisations. These assignments include aspects such as sustainability, leadership, people's conditions and societal impact, making these aspects part of the course content.

Programme outcomes

The Higher Education Ordinance specifies the outcomes required for certain degrees. The outcomes for a Degree of Bachelor of Science in Engineering are as follows:

For a Degree of Bachelor of Science in Engineering the student shall demonstrate the knowledge and skills required to work autonomously as a graduate engineer.

Knowledge and understanding

For a Degree of Bachelor of Science in Engineering the student shall

- demonstrate knowledge of the disciplinary foundation of the engineering field chosen and proven experience in this field as well as awareness of current research and development work, and
- demonstrate broad knowledge in the engineering field chosen and relevant knowledge of mathematics and the natural sciences.

Competence and skills

For a Degree of Bachelor of Science in Engineering the student shall

- demonstrate the ability to identify, formulate and deal with issues autonomously and creatively using a holistic approach and to analyse and evaluate technological solutions
- demonstrate the ability to plan and using appropriate methods undertake tasks within predetermined parameters
- demonstrate the ability to use knowledge critically and systematically to model, simulate, predict and evaluate series of events on the basis of relevant information
- demonstrate the ability to design and manage products, processes and systems while taking into account the circumstances and needs of individuals and the targets for economically, socially and ecologically sustainable development set by the community
- demonstrate the capacity for teamwork and collaboration with various constellations, and
- demonstrate the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences.

Judgement and approach

For a Degree of Bachelor of Science in Engineering the student shall

- demonstrate the ability to make assessments informed by relevant disciplinary, social and ethical aspects
- demonstrate insight into the possibilities and limitations of technology, its role in society and the responsibility of the individual for how it is used, including social and economic aspects as well as environmental and occupational health and safety aspects, and
- demonstrate the ability to identify the need for further knowledge and undertake ongoing development of his or her skills.

Programme structure

In the first year, students take basic courses in core subjects of mechanical engineering, such as mechanics and materials science, as well as general engineering and mathematics. During the second year, courses gradually shift towards more applied subjects with substantial elements of laboratory work and project assignments. The third year includes elective courses where the students choose a specialisation. The third year also includes courses with project work related to industry, such as Sustainable product development, Production systems II (elective) and Machine design II (elective).

Courses are normally assessed through written assignments, often done in pairs or groups, as well as individual exams.

The programme concludes with a degree project (22.5 credits) in collaboration with an external partner, individually or in pairs.

Upon successful completion of the programme, students are awarded the professional qualification Degree of Bachelor of Science in Mechanical Engineering. Students who wish to prepare for further studies at Master's level can opt to take an additional mathematics course of 7.5 credits in combination a degree project of 15 credits. These two courses will then replace the degree project of 22.5 credits.

Internationalisation

Karlstad University wants to promote collaboration and exchange with other universities. Karlstad University has partnerships with many other universities in Sweden and abroad, and has an organisation in place to support students who want to make use of this opportunity. Students are therefore encouraged to complete part of the programme at a university abroad.

Programme curriculum ¹

Mandatory courses:

Mathematics 22.5 credits

General engineering 22.5 credits (Programming, electrical principles, energy engineering)

Mechanics 15 credits

Solid mechanics 15 credits

Materials engineering 15 credits

Product development and machine design 37.5 credits

Production and manufacturing technology 15 credits

Degree project 22.5 credits

Optional courses (15 credits)

FEM 7.5 credits

Manufacturing technology 7.5 credits

Ergonomics 7.5 credits

Production systems 7.5 credits

Machine design 7.5 credits

Preparatory specialisation for Master's degree (22.5 credits)

Mathematics 7.5 credits in combination with degree project 15 credits, replacing degree project 22.5 credits.

Credit transfer

Students have the right to transfer credits from previously completed university courses in Sweden or abroad. Credit transfer is subject to approval according to the current regulations.

Additional information

The local regulations for first and second cycle education at Karlstad University stipulate the obligations and rights of students and staff.

This programme syllabus will replace the previous version approved 1 December 2022 (HNT 2022/658).

¹ Names of subject areas; courses included in the programme may have different titles.