



Faculty of Technology and Science

PROGRAMME STUDY PLAN

Programme Code	TAMMT
Programme Approval	The Programme Study Plan was approved by the Faculty Board of Technology and Science on 7 June 2007 and is valid from the autumn semester of 2007 at Karlstad University.
Programme Title	Master of Science in Engineering, Degree Programme in Mechanical Engineering with specialisation in Materials Engineering
Credits	120
Language of Instruction	English or Swedish
Degree Level	Master
Degree Type	Professional degree

Prerequisites

A Bachelor's degree of 180 ECTS cr. in Mechanical Engineering, Materials Engineering, or equivalent, including the following:

- Mathematics 35 ECTS cr. covering basic one and multivariable calculus, introduction to vector analysis, partial differential equations and complex analysis, linear algebra, and computer numerical analysis and mathematical statistics.
- Basic science 20 ECTS cr. including mechanics and thermodynamics.
- Basic mechanical engineering 90 ECTS, including materials and design.
- Course/s relevant to engineering 6 ECTS cr. in the humanities, social sciences or gender studies.

General Information

The aim of the study programme is that students acquire advanced qualifications in the field of mechanical engineering with specialisation in materials engineering. The training is designed to provide a mechanical engineering perspective with a basis in materials, design and manufacturing engineering. The focus is on engineering design application, which includes functional materials and construction materials in the manufacturing process, designs and consumption products. The programme prepares students for design work, industrial research and development, and for doctoral studies.

Aims

Upon completion of the programme students should, beyond the general requirements for a Master's degree specified in the *Higher Education Ordinance, SFS 2006:1053*, be able to:

- give an account of and discuss advanced knowledge in materials engineering,
- give an account of basic knowledge of design and manufacturing engineering,
- provide a comprehensive view of materials, design and manufacturing engineering,
- use knowledge and skills in the simulation and modelling of materials properties and designs,
- demonstrate ability and experience of active participation in industrial research and development work,
- use systematic project management methods to plan, carry out and evaluate major and minor project,
- work in a group and with others in international and interdisciplinary contexts, showing gender awareness,
- demonstrate preparedness to contribute to sustainable development, for instance, in choice of materials and processes.

Programme Structure

The programme runs over four terms, the last including the degree project. The first three terms are connected through a common theme. The studies are partly in the form of projects in which students work together with the same task. Students practise

presenting their work orally and in writing. The structure allows students to combine courses to create a programme matched to their needs and interests.

Programme Curriculum

Term 1

Theme: Materials, form and manufacturing

The aim is to provide further knowledge and reinforce basic knowledge of materials, form and manufacturing and their function in the design process. Students are also expected to learn to master IT-tools while working on projects, for instance, drawing up CAD-plans, performing strength calculations, selecting materials, and simulating manufacturing processes.

Courses

Mandatory	Programme electives	Electives
Engineering Design, 7,5 ECTS cr.	Manufacturing Technology, 7,5 ECTS cr.	
Materials in Industrial Applications, 7,5 ECTS cr.	Materials characterization, 7,5 ECTS cr.	
Project Work on Engineering Design, 7,5 ECTS cr.		

Term 2

Theme: Materials, models and simulation

The aim is to provide advanced knowledge in the field of materials engineering and developing student ability to use numerical methods in strength calculation and their ability to work with industrial development.

Courses

Mandatory	Programme electives	Electives
Deformation and Failure, 7,5 ECTS cr.		
Simulation and modelling, 7,5 ECTS cr.		
Project Management, 7,5 ECTS cr.		
Project work on simulation and modelling, 7,5 ECTS cr.		

Term 3

Theme: Materials and mechanical properties

The aim is to provide advanced knowledge in the field of materials engineering linking microstructures (composition of materials), mechanical properties and materials development trends. Students are also expected to develop their abilities to do research in an industrial or academic setting.

Courses

Mandatory	Programme electives	Electives
Composites, 7,5 ECTS cr.	Surface Technology and Tribology, 7,5 ECTS cr.	
Project work on future Engineering Materials, 7,5 ECTS cr.	Materials characterization, 7,5 ECTS cr.	

Term 4

Degree project 30 ECTS cr.

Degree Title

Master of Science Major Mechanical Engineering

Credit Transfer

According to the *Higher Education Ordinance* (Ch 6, § 12-14), students may transfer credits from previously completed university courses subject to approval. Transfer of credits for a course module, or university studies generally, is subject to the approval by the course examiner. Transfer of credits for a full course is subject to the approval by the Rector

Additional Information

Students who enrolled in the programme before 1 July 2007 will complete their studies in accordance with the requirements of the earlier curriculum. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

Moving Up

In order to move up to the next level, students on the programme must have completed 45 ECTS cr. in the previous year. Students are not allowed to start working on their Degree project until they have completed 60 ECTS cr.

The local regulations for undergraduate studies at Karlstad University stipulate the obligations and rights of students and staff.