Mechanical Engineering, Master's Programme

120 credits

Mechanical Engineering, masterprogram

6MMEC

Valid from: 2017 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2017-01-25

Purpose

A Master of Science in Mechanical Engineering from Linköping University works with all aspects of the realization of complex products and industrial processes. A graduate from this program will be able to take part in multidisciplinary design processes where technical as well as economical, environmental and sustainability requirements are satisfied.
The programme is aimed at students with a Bachelor degree who would like to extend their knowledge in mechanical engineering and engineering science. Graduates are suitable for employment in industry, business, academic institutions and at major research/development laboratories.

Aim

Mathematics, natural sciences and engineering subjects
A Master of Science in Mechanical Engineering

- should have solid foundations in mathematics and engineering science
- should be able to use computer effectively to model and analyze engineering problems as well as to visualize results
- should have a specialized knowledge in one area of mechanical engineering

Personal and professional skills
A Master of Science in Mechanical Engineering

- should have the ability to take a leading role in modern research and engineering
- should be able to gain competency in new fields of engineering, rapidly and independently
- should be able to participate effectively in multidisciplinary design teams, either as team leader or in a specialist role

Interpersonal skills: Teamwork and communication
A Master of Science in Mechanical Engineering

- should be capable of teamwork and collaborate actively within the group by sharing in the tasks and responsibilities
- should be able to initialize, to plan, to carry out and to evaluate scientific and engineering projects
- should be able to communicate and to give presentations in english, orally and in writing

Content

The curriculum includes a core semester with courses such as Engineering Materials, Computerized Manufacturing Equipment and Statistics. After the core semester the student selects a specialization with advanced courses as well as freely elective courses. The programme ends with a one semester Master's thesis in industry or at the university. After the programme the students will be attractive both to industry and to academia.

Entry requirements

- Bachelor's degree in mechanical engineering, or equivalent
- 30 ECTS credits in mathematics/applied mathematics and/or application of mathematics relevant for the programme
- English corresponding to the level of English in Swedish upper secondary education (English 6/B)

Degree thesis

The thesis should be based on the high quality scientific content and carried out in close contact with the research groups involved in the programme and in the area of the profile chosen by the students. The major subject of the Thesis work should be Mecanical Engineering.

Degree requirements

The programme is designed to give the Master's Degree "Teknologie masterexamen i maskinteknik" translated to "Degree of Master of Science (Two Years) with a major in Mechanical Engineering".
The requirements are the following:

- a Bachelor's degree as specified in the entrance requirements
- course requirements for a total of 120 ECTS credits from courses from the curriculum of the programme, or after special decision from the programme board, and thesis work.
- passed the requirements for all compulsory courses
- courses on advancement level A (advanced) 90 ECTS credits including:
    - at least 30 ECTS credits courses from the major subject (Mechanical Engineering)
    - a 30 ECTS credits Master's Thesis in the major subject (Mechanical Engineering)
- at least 45 ECTS credits from courses in mathematics or applications of mathematics from the Bachelor level (basic) or Master level (advanced), see list of specific courses
- a Master's thesis in major subject Mecanical Engineering presented and passed as per Linköping Institute of Technology degree regulations.

Courses overlapping each other regarding contents are not allowed to be included in the degree. Courses used for the Bachelor's degree can never be included in the Master's degree

Degree in Swedish

Master of Science (120 credits) with a major in Mechanical Engineering

Degree in English

Master of Science (two years) with a major in Mechanical Engineering

Specific information

Graduate Level Courses
Certain PhD courses can be taken by master students. These course selections are subject to formal decision by the executive committee of the Program Board.

Common rules

See also common rules.

Curriculum

Semester 1 (Autumn 2017)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TEIO32	Project Management and Organization	6*	G2X	3	C
TKMJ14	Large Technical Systems and the Environment	6	A1X	1	C
TMKT78	Product Development	6	G2X	2	C
Period 2					
TEIO32	Project Management and Organization	6*	G2X	1	C
TMHL63	Introduction to Computational Mechanics	6	G2X	3	C
TMKM17	Polymer Materials	6	A1X	4	C

Semester 2 (Spring 2018)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMAL51	Aircraft Conceptual Design	6	A1F	2	E
TMHL41	Continuum Mechanics	6	A1X	2	E
TMHL62	The Finite Element Method; advanced course	6	A1X	4	E
TMHP02	Fluid Power Systems	6	G2X	4	E
TMHP51	Hydraulic Servo Systems	6	A1N	3	E
TMKM40	Engineering Materials - New Materials	6	A1X	2	E
TMKT48	Design Optimization	6	A1X	3	E
TMKT74	Advanced CAD	6	A1X	1	E
TMMS30	Multi Body Dynamics and Robotics	6	A1X	3	E
TMMV08	Computational Fluid Dynamics	6	A1X	3	E
TMPS42	Production System Automation	6	A1X	1	E
TMQU31	Statistical Quality Control	6	A1X	2	E
TPPE78	Quantitative Models and Analysis in Operations Management	6	A1X	1	E
TMPP02	Project Course - Race Vehicle Engineering	6*	G1X	-	V
Period 2					

Course code	Course name	Credits	Level	Timetable module	ECV
TMHL61	Damage Mechanics and Life Analysis	6	A1X	2	E
TMKM09	Engineering Materials for Lightweight Applications	6	A1X	3	E
TMKM18	Engineering Materials, Welding and Manufacturing Technology	6	G2X	2	E
TMKT57	Product Modelling	6	A1X	3	E
TMME11	Road Vehicle Dynamics	6	A1X	1	E
TMMS10	Fluid Power Systems and Transmissions	6	A1X	2	E
TMMV07	Computational Fluid Dynamics, advanced course	6	A1X	4	E
TMMV56	Aerodynamics, Continued Course	6	A1X	3	E
TMPS27	Production Systems	6	A1X	3	E
TMQU04	Six Sigma Quality	6	A1X	2	E
TPPE74	Design and Development of Manufacturing Operations	6	A1X	4	E
TSFS03	Vehicle Propulsion Systems	6	A1X	3	E
TMPP02	Project Course - Race Vehicle Engineering	6*	G1X	-	V

Specialisation: Applied Mechanics

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMHL41	Continuum Mechanics	6	A1X	2	E
TMHL62	The Finite Element Method; advanced course	6	A1X	4	E
TMMV08	Computational Fluid Dynamics	6	A1X	3	E
Period 2					
TMHL61	Damage Mechanics and Life Analysis	6	A1X	2	E
TMME11	Road Vehicle Dynamics	6	A1X	1	E
TMMV07	Computational Fluid Dynamics, advanced course	6	A1X	4	E
TMMV56	Aerodynamics, Continued Course	6	A1X	3	E

Specialisation: Engineering Design and Product Development

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMKT48	Design Optimization	6	A1X	3	E
TMKT74	Advanced CAD	6	A1X	1	E
Period 2					
TMKT57	Product Modelling	6	A1X	3	E

Specialisation: Engineering Materials

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMKM40	Engineering Materials - New Materials	6	A1X	2	E
Period 2					
TMHL61	Damage Mechanics and Life Analysis	6	A1X	2	E
TMKM09	Engineering Materials for Lightweight Applications	6	A1X	3	E
TMKM18	Engineering Materials, Welding and Manufacturing Technology	6	G2X	2	E

Specialisation: Manufacturing Engineering

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMPS42	Production System Automation	6	A1X	1	E
TMQU31	Statistical Quality Control	6	A1X	2	E
TPPE78	Quantitative Models and Analysis in Operations Management	6	A1X	1	E
Period 2					
TMKM18	Engineering Materials, Welding and Manufacturing Technology	6	G2X	2	E
TMPS27	Production Systems	6	A1X	3	E
TMQU04	Six Sigma Quality	6	A1X	2	E
TPPE74	Design and Development of Manufacturing Operations	6	A1X	4	E

Specialisation: Mechatronics

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMHP02	Fluid Power Systems	6	G2X	4	E
TMHP51	Hydraulic Servo Systems	6	A1N	3	E
Period 2					
TMMS10	Fluid Power Systems and Transmissions	6	A1X	2	E

Semester 3 (Autumn 2018)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TFYA88	Additive Manufacturing: Tools, Materials and Methods	6	A1N	3	E
TKMJ31	Biofuels for Transportation	6	A1N	1	E
TMAL02	Aircraft and Vehicle Design	6	G2F	4	E
TMHL19	Advanced Material and Computational Mechanics	6	A1X	1	E
TMKM16	Sustainable Material Selection	6	A1X	4	E
TMKT79	Collaborative Multidisciplinary Design Optimization	6	A1X	2	E
TMME14	Machine Elements, Second Course	6	A1X	3	E
TMME40	Vibration Analysis of Structures	6	A1X	3	E
TMMS11	Models of Mechanics	6*	A1X	3	E
TMMS13	Electro Hydraulic Systems	6	A1X	2	E
TMMV01	Aerodynamics	6	A1X	2	E
TMMV12	Gas Turbine Engines	6	A1F	4	E
TMPS33	Virtual Manufacturing	6	A1N	4	E
TMPS35	Emerging Factory Technologies	6	A1N	3	E
TMPP02	Project Course - Race Vehicle Engineering	6*	G1X	-	V
Period 2					
TAMS11	Probability and Statistics, first course	6	G2F	4	E
TAOP18	Supply Chain Optimization	6	A1F	1	E
TMHL03	Mechanics of Light Structures	6	A1X	3	E

Course code	Course name	Credits	Level	Timetable module	ECV
TMHP03	Engineering Systems Design	6	A1X	4	E
TMKM90	Engineering Materials - Deformation and Fracture	6	A1X	2	E
TMME50	Flight Mechanics	6	A1X	2	E
TMMS07	Biomechanics	6	A1X	4	E
TMMS11	Models of Mechanics	6*	A1X	4	E
TMMS20	Structural Optimization	6	A1X	1	E
TMMV18	Fluid Mechanics	6	A1X	2	E
TMMV54	Computational Heat Transfer	6	A1X	1	E
TMPS22	Assembly Technology	6	A1N	3	E
TMPS31	Sustainable Manufacturing	6	A1X	1	E
TMPP02	Project Course - Race Vehicle Engineering	6*	G1X	-	V

Specialisation: Applied Mechanics

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMPM07	Project Course Advanced - Applied Mechanics	12*	A1X	-	C
TMHL19	Advanced Material and Computational Mechanics	6	A1X	1	E
TMME14	Machine Elements, Second Course	6	A1X	3	E
TMME40	Vibration Analysis of Structures	6	A1X	3	E
TMMS11	Models of Mechanics	6*	A1X	3	E
TMMV01	Aerodynamics	6	A1X	2	E
TMMV12	Gas Turbine Engines	6	A1F	4	E
Period 2					
TMPM07	Project Course Advanced - Applied Mechanics	12*	A1X	-	C
TMHL03	Mechanics of Light Structures	6	A1X	3	E
TMME50	Flight Mechanics	6	A1X	2	E
TMMS07	Biomechanics	6	A1X	4	E
TMMS11	Models of Mechanics	6*	A1X	4	E
TMMS20	Structural Optimization	6	A1X	1	E
TMMV18	Fluid Mechanics	6	A1X	2	E
TMMV54	Computational Heat Transfer	6	A1X	1	E

Specialisation: Engineering Design and Product Development

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMPM05	Project Course Advanced - Design Engineering and Product Development	12*	A1X	-	C
TMKT79	Collaborative Multidisciplinary Design Optimization	6	A1X	2	E
TMME14	Machine Elements, Second Course	6	A1X	3	E
Period 2					
TMPM05	Project Course Advanced - Design Engineering and Product Development	12*	A1X	-	C
TMHP03	Engineering Systems Design	6	A1X	4	E

Specialisation: Engineering Materials

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMPM09	Project Course Advanced - Engineering Materials	12*	A1X	-	C
TMHL19	Advanced Material and Computational Mechanics	6	A1X	1	E
TMKM16	Sustainable Material Selection	6	A1X	4	E
Period 2					
TMPM09	Project Course Advanced - Engineering Materials	12*	A1X	-	C
TMKM90	Engineering Materials - Deformation and Fracture	6	A1X	2	E

Specialisation: Manufacturing Engineering

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMPM08	Project Course Advanced - Manufacturing Engineering	12*	A1F	-	C
TMPS33	Virtual Manufacturing	6	A1N	4	E
TMPS35	Emerging Factory Technologies	6	A1N	3	E
Period 2					
TMPM08	Project Course Advanced - Manufacturing Engineering	12*	A1F	-	C
TAOP18	Supply Chain Optimization	6	A1F	1	E
TMPS22	Assembly Technology	6	A1N	3	E
TMPS31	Sustainable Manufacturing	6	A1X	1	E

Specialisation: Mechatronics

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TMPM06	Project Course Advanced - Mechatronics	12*	A1X	-	C
TMMS13	Electro Hydraulic Systems	6	A1X	2	E
Period 2					
TMPM06	Project Course Advanced - Mechatronics	12*	A1X	-	C
TMHP03	Engineering Systems Design	6	A1X	4	E

Semester 4 (Spring 2019)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TQXX30	Degree project - Master's Thesis	30*	A1X	-	C
Period 2					
TQXX30	Degree project - Master's Thesis	30*	A1X	-	C

ECV = Elective / Compulsory /Voluntary
*The course is divided into several semesters and/or periods