Programme syllabus

An accessible version of the syllabus can be found in the Course and programme directory.

Degree Programme in Design and Product Realisation 300 credits

Civilingenjörsutbildning i design och produktframtagning

Valid for students admitted to the education from autumn 16 (HT - Autumn term; VT - Spring term).

This is a translation of the Swedish, legally binding, programme syllabus.

Programme objectives

In addition to the objectives specified in the Swedish Higher Education Ordinance, a graduate Master of Science in Engineering from Design and Product Realisation at KTH shall …

Knowledge and understanding

- possess extensive knowledge of the product realisation process so as to be able to produce products that are tailored to people, technology and society. This includes, for example, material selection, energy sources, production methods, assessment of economic and environmental impact, etc.

• have a good grounding in natural and engineering sciences with a second-cycle specialisation within one area of application within the chain: design – construction – production, all with a life-cycle perspective.

Skills and abilities

• have the ability to combine and transform the traditional natural and engineering sciences foundation in the education to construction and design aspects as a basis for the development of attractive products and services

• possess the requisite personal and professional skills, such as in the area of language, leadership, project management and communication, to work as an engineer in a management position or as a leader within a technology-intensive company

• have significantly developed their own innovative capability through design thinking and creative methods as a complement to the analytical approach

Ability to make judgements and adopt a standpoint

• Have especially good understanding that engineering-related problems, considered from a system perspective, are often complex, incompletely defined and sometimes contain contradictions

• Show an understanding of responsibility and ethics relevant for all steps in the product realization process, e.g. design – construction – production/manufacturing and utlitilization.

The local degree ordinance of the Royal Institute of Technology can be found in the KTH Regulations.

Extent and content of the programme

The Degree Programme in Design and Product Realisation comprises 300 higher education credits, which corresponds to 5 years of full-time studies at a normal study pace (10 semesters).

The programme's first three years (180 credits) are primarily first cycle.

During the two final years (120 credits), the student undertakes a Master's programme.

Master's programme courses are conducted primarily in the second cycle.

The academic year 2016/2017 offers the following Master's programmes for a Degree of Master of Science in Design and Product Realisation

Integrated Product Design

Production Engineering and Management

Engineering Design

Industrial Engineering and Management

Sustainable Energy Engineering

Aerospace Engineering

Vehicle Engineering

Naval Architecture

Engineering Mechanics

Technology and Sustainable Development

On some Master's programmes there are requirements for specific courses in addition to the Master's programme's compulsory courses in order to obtain a Degree of Master of Science in Design and Product Realisation, for example, engineering profiles.

The range of offered Master's programmes may be revised. An updated list of elective Master's programmes can be found on the KTH student web for each respective academic year.

Language of instruction
The language of instruction for the first three years of first cycle is mainly Swedish, and the language of instruction in the second cycle for the final two years is mostly English.

Eligibility and selection

Admission to the Degree Programme in Design and Product Realisation requires the general entry requirements for higher education, and also special admission requirements as follows:

Upper-secondary education before 1 July 2011 and upper-secondary adult education before 1 July 2012

Field-specific entry requirement 9

Specific admission requirements corresponding to:

Mathematics E, Physics B and Chemistry A.
In each of the subjects, a minimum grade of Pass or 3 is required.

Upper-secondary education from 1 July 2011 and upper-secondary adult education from 1 July 2012 (Gy11/Vux12)

Field-specific entry requirement A9

Specific admission requirements corresponding to:

Mathematics 4, Physics 2 and Chemistry 1.
A grade of E is required as a minimum in each of the subjects.

* For more information on field-specific entry requirements, see www.uhr.se

For entry requirements and selection principles, see the KTH admission regulations, www.kth.se.

Implementation of the education

Structure of the education

Programme arrangement

The academic year comprises 40 weeks and is divided into four periods. If necessary, instruction may be provided outside the parameters of the academic year.

The division of the academic year is presented on the KTH student web, http://www.kth.se

Years 1-3, studies at first cycle

The programme syllabus consists of the compulsory foundation block in the years 1-3 in the first cycle, and also of a Master's programme in the second cycle, years 4 and 5, which concludes with a degree project of 30 credits.

The programme is organised around courses in applied subjects relating to mathematics, engineering science and technology. The teaching and use of professional skills and abilities of great importance to a certified engineer, for example, communication, project work, systems thinking, ethics, entrepreneurship, sustainable development, corporate and societal aspects, are integrated into the courses.

To create a unified whole, the programme emphasises cooperation between different subjects, both within a specific year and between years. This is achieved, inter alia, through the programme-specific courses (the "DoP" courses during the first three years) including project assignments where knowledge gained from other courses is integrated and applied in a product realisation perspective.

Mathematical natural science courses

This block contains basic courses in mathematics and natural science and is chiefly located in year 1 and year 2.

Technology courses

This block includes basic engineering science courses within the field of mechanical engineering, such as solid mechanics, thermodynamics, engineering materials and production. This block is begun in year 1 and concluded in year 3.

The first 3 years conclude with a degree project for a Degree of Bachelor worth 15 credits within a chosen technical field.

Years 4-5 in the second cycle

The Master's programmes consist mainly of advanced courses and a degree project within one and the same engineering science discipline. Students on the Degree Programme in Design and Product Realisation can choose from a wide range of Master's programmes with programme syllabuses established in advance. There is no restriction on the number of places on these Master's programmes for students on the Degree Programme in Design and Product Realisation.

Professional skills and abilities in, for example, entrepreneurship, engineering skills and innovation, are deepened in the engineering courses in years 4 and 5, where labour market links are also of great importance for the final degree project.

The engineer's knowledge of the environment and sustainable development is deepened and concretised through integrating the special aspects of, for example, life-cycle analysis, environmental impact and material selection, which are characteristic of the chosen Master's programmes, in the programme's courses.

One purpose of a concluding Master's programme is that students establish close contact with the department where the degree project will be carried out, and with a research group there.

Elective Master's programmes that lead to a Degree of Master of Science in Engineering are found under the heading “Scope and content of the programme”.

Courses

The programme is course-based. Lists of courses are included in appendix 1.

The programme is structured in the form of courses. Course lists are found in appendix 1.

The programme consists of compulsory, conditionally elective, recommended and optional courses. The compulsory and conditionally elective courses are defined for each year in course lists. The goals, entrance qualifications, content and course requirements for each course can be found in the official course syllabuses.

The forms of teaching and examination vary between courses. These are indicated in each official course syllabus.

The optional courses can be chosen from KTH's range of offered courses. Credits from courses at other universities/higher education institutions can also be transferred if the qualification requirements are met.

The following limitations apply to optional courses:

- Optional courses may not be taken in year 1.
- There is a limit imposed on the number of credits that may be chosen per semester
- An optional course may not correspond to a significant extent to an existing programme course or an already credited course
- Higher education preparatory courses may not be counted as optional courses
- Optional courses may be chosen but should be relevant to the professional role of engineer.

Grading system

Courses in the first and the second cycle are graded on a scale from A to F. A-E are passing grades, A is the highest grade. The grades pass (P) and fail (F) are used for courses under certain circumstances.

Conditions for participation in the programme

Semester registration
At the beginning of the semester, the student must submit a compulsory semester registration via their personal login atwww.kth.se

Semester registration is required to take new courses and for credits awarded to be reported, and for any payments of student aid to be made by CSN.

Application for courses on the programme

Prior to each semester, the student must apply for all courses the student intends to take.

Course applications are made via www.antagning.se

- 1 - 15 May for autumn semesters
- 1 - 15 November for spring semesters

If the student does not apply via www.antagning.se, the application is only considered subject to availability.

The student can obtain information on how to apply from the school's office of student affairs.

Course registration

Course registration requires that the student is admitted to the course. At course start, the student must register on the course to which they have been admitted.

Course registration must be done individually, either via the student's personal login at www.kth.se or according to instructions from the school offering the course.

A person who has registered on a course, but has subsequently decided not to proceed with the course, must inform the school offering the course as soon as possible or, within three weeks, remove the course registration via the personal login.

Course registration requires that the student has been admitted to the course.

Conditions for participation in the instruction

For studies in the next year, there are certain moving-up/performance requirements according to the programme's course list.

Students who do not fulfil these requirements must establish an individual study plan together with the study advisor.

Requirements for moving up from year 1 to year 2:

• At least 45 credits from year 1

shall be completed by the end of the re-examination period in August, according to the course list of the programme syllabus for the Degree Programme in Design and Product Realisation.

Requirements for moving up from year 2 to year 3:

• At least 90 credits from year 1 and 2, of which

• at least 50 credits are from year 1,

shall be completed by the end of the re-examination period in August, according to the course list of the programme syllabus for the Degree Programme in Design and Product Realisation.

Requirements for moving up from year 3 to year 4/year 1 of the Master's Programme:

• At least 150 credits from years 1-3

• at least 110 credits from years 1-2

• a Bachelor's degree project (15 credits),

shall be completed by the end of the re-examination period in August, according to the course list of the programme syllabus for the Degree Programme in Design and Product Realisation.

Requirements for moving up from year 4 to year 5/year 1 to year 2 of the Master's Programme:

In addition to what is required for moving up to year 4/year 1 of the Master's Programme,

• at least 45 credits* from year 4/year 1 of the Master's Programme must

be completed by the end of the examination period in August, according to the course list of the programme syllabus for the Degree Programme in Design and Product Realisation.

* In addition to compulsory courses, optional courses that are included in the degree may also be counted.

Individual study plan

Students who do not meet the above requirements should, in consultation with the programme's study advisor, establish an individual study plan for the continuing studies.

An individual study plan may mean that the student cannot be guaranteed full-time studies.

See the KTH regulatory framework: www.kth.se

Recognition of previous academic studies

Students have the opportunity to apply to be given credit for results from a course or courses at another higher education institution/university within or outside the country.

An application is made by submitting a form to the school's office of student affairs.

The entire KTH policy for credit transfer is included in the KTH regulatory framework.www.kth.se

As the grading systems differ between countries and universities, grades are not translated to the KTH grading scale during credit transfer.

Studies abroad

Students have the opportunity to study abroad through the agreements that KTH and ITM have with universities within and outside the EU. Exchange studies normally cannot be pursued during the first or second year. It is also possible to do a degree project abroad.

The application deadline for studies abroad is around 15 December for the following academic year.

Degree project

Degree Project, First Cycle
The Degree Programme in Design and Product Realisation includes a degree project for a Degree of Bachelor of Science which comprises 15 credits. The degree project will be conducted during the spring term in study year 3.

In order to be eligible for the degree project, the following requirements are reported in Ladok before the degree project starts

- Promoted to grade 3.
- At least 120 credits of the program's mandatory courses.
- Specific requirements for the degree project course

In order to enable the approval of the exam in good time before the degree project begins in period 3, there is the possibility of meeting an alternative qualification requirement for degree projects that start spring term 2019. For this alternative eligibility, the following requirements are reported in Ladok at the latest, December 1, 2018

- Promoted to grade 3.
- At least 105 credits of the program's mandatory courses.
- Specific requirements for the degree project course

KTH's General Regulations for Degree Projects, first cycle, 15 credits for a Degree of Bachelor of Science 180 credits, are in KTH's regulations. www.kth.se

Degree project, Second Cycle

The Degree Programme in Design and Product Realisation includes a degree project for a Degree in Master of Science in Engineering, which comprises 30 credits. The degree project is usually done during the spring term in study year 5. To begin the degree project is required

- At least 240 credits completed courses that may be included in the Degree in Master of Science in Engineering.
- Maximum 2 unfinished courses (mandatory and conditionally elective) from study year 1 - 3
- The requirement for studies in study year 5 are met.

KTH's General Regulations for Degree Projects, second cycle, 30 credits for a Degree in Master of Science in Engineering 300 credits, are in KTH's regulations. www.kth.se

Degree

In order to complete a Degree in Master of Science in Engineering, Degree Program Design and Product Realisation, requires an approved grade in all courses included in the students study plan based on the degree programme. The study plan shall comprise 300 credits, which includes a degree project, first cycle comprising 15 credits and a degree project, second cycle comprising 30 credits.

Optional introductory courses and preparatory courses cannot be included as part of the degree.

Courses whose content is similar to one or more other courses within the programme cannot be counted as part of the 300 credits that form the basis for the degree.

Optional courses will contribute to the degree programme objectives of Design and Product Realisation and the professional role.

Application for a degree certificate
The student must personally apply for a certificate.Applications are made via a personal login at www.kth.se.

The student has the possibility of applying for the following three degree:

Title of general qualification at first cycle
Bachelor of Science (180 credits)
Teknologie kandidatexamen

Title of professional qualifications at second cycle
Master of Science in Engineering
Civilingenjörsexamen

Title of general qualification at second cycle
Master of Science (120 credits)
Teknologie masterexamen

Refer to the KTH guidelines (KTH regulatory framework), local directions for higher education qualifications at first and second cycle, the local Degree Ordinance
http://intra.kth.se/regelverk

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions

Appendix 1: Course list

Degree Programme in Design and Product Realisation (CDEPR)

General courses

Year 1

Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
MF1061	Introduction to Design and Product Realisation	9.0 hp	First cycle
MF1062	Design and Product Realization	6.0 hp	First cycle
SF1522	Numerical Computations	6.0 hp	First cycle
SF1523	Analytical and Numerical Methods for Differential Equations	7.5 hp	First cycle
SF1624	Algebra and Geometry	7.5 hp	First cycle
SF1625	Calculus in One Variable	7.5 hp	First cycle
SF1626	Calculus in Several Variables	7.5 hp	First cycle
SG1130	Mechanics I	9.0 hp	First cycle

Year 2

Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu.

			level
MF1039	Design and Product Realization, Components	6.0 hp	First cycle
MF1063	Materials in Design and Product Realisation	9.0 hp	First cycle
MF1064	Modelling and Simulation in Design and Product Realization	9.0 hp	First cycle
MG1016	Manufacturing Technology	6.0 hp	First cycle
MJ1112	Applied Thermodynamics	9.0 hp	First cycle
SD1116	Design of Silent and Vibration-free Products	6.0 hp	First cycle
SE1020	Solid Mechanics, Basic Course	9.0 hp	First cycle
SG1140	Mechanics II	6.0 hp	First cycle

Year 3

Mandatory courses (24.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
MF130X	Degree Project in Machine Design, First Cycle *One of the Degree projects 15 hp must be chosen.*	15.0 hp	First cycle
MF131X	Degree Project in Integrated Product Development, First Cycle *One of the Degree projects 15 hp must be chosen.*	15.0 hp	First cycle
MF132X	Degree Project in Industrial Design Engineering, First Cycle *One of the Degree projects 15 hp must be chosen. Only for students admitted to CDEPR*	15.0 hp	First cycle
MF133X	Degree Project in Mechatronics, First Cycle *One of the Degree projects 15 hp must be chosen.*	15.0 hp	First cycle
MG110X	Degree Project in Production Engineering, First Cycle *One of the Degree projects 15 hp must be chosen.*	15.0 hp	First cycle
MJ146X	Degree Project in Sustainable Energy Engineering, First Cycle *One of the Degree projects 15 hp must be chosen.*	15.0 hp	First cycle

SA118X	Degree Project in Mechanical Engineering, First Level *One of the Degree projects 15 hp must be chosen.*	15.0 hp	First cycle

Supplementary information

Degree project, bachelor level, 15 credits, is a compulsory course during the spring term.

During the third year 3 conditionally elective courses should be chosen.

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Design and Product Realization takes place within framework of a Master program.

Available Master programs for Design and Product Realization:

- Integrated Product Design
  Track, Innovation Management and Product Development
  Track, ***Industrial Design Engineering***
- Industrial Production
- Engineering Design
  Track, Combustion Engineering
  Track, Machine Design
  Track, Mechatronics
- Industrial Product Development
- Aerospace
- Industrial Management ***(Technical Profile: Engineering Design, Energy, Production or Solid Mechanics)***
- Naval Architecture
- Sustainable Energy Engineering
- Technical Mechanics
- Engineering Mechanics
  Track, Fluid Mechanics
  Track, Solid Mechanics
  Track, Sound and Vibrations
- Vehicle Engineering

Some Masterprograms require specific courses during study year 3.

Year 4

Supplementary information

Based upon the curriculum for academic year 2016/2017. Changes may occur.

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Design and Product Realization takes place within framework of a Master program.

Available Master programs for Design and Product Realization:

- Integrated Product Design
- Industrial Production
- Industrial Product Development
- Aerospace
- Industrial Management
- Naval Architecture
- Sustainable Energy Engineering
- Technical Mechanics
- Vehicle Engineering

Year 5

Supplementary information

Based upon the curriculum for academic year 2016/2017. Changes may occur.

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Design and Product Realization takes place within framework of a Master program.

Available Master programs for Design and Product Realization:

- Integrated Product Design
- Industrial Production
- Industrial Product Development
- Aerospace
- Industrial Management

- Naval Architecture
- Sustainable Energy Engineering
- Technical Mechanics
- Vehicle Engineering

Master, Aerospece Engineering (AEE)

Year 3

Mandatory courses (42.0 Credits)

Code	Name	Credits	Edu. level
EL1010	Automatic Control, General Course	6.0 hp	First cycle
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle
SF1916	Probability Theory and Statistics *Previous SF1901*	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1220 given in period 1 can be chosen instead*	6.0 hp	First cycle

Recommended courses

Code	Name	Credits	Edu. level
SE1025	FEM for Engineering Applications	6.0 hp	First cycle

Supplementary information

One of the courses SG1217 or SG1220 must be chosen.

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle

- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Master, Vehicle Engineering (FOR)

Year 3

Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
EL1010	Automatic Control, General Course	6.0 hp	First cycle
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science *At least one of the Conditionally Elective courses must be chosen.*	9.0 hp	First cycle
HM1025	Ergonomics in Product Development *At least one of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
MF1025	Model Based Product Development II *At least one of the Conditionally Elective courses must be chosen. MF130X and MF1025: Only one of the courses can be chosen.*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production *At least one of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle

	At least one of the Conditionally Elective courses must be chosen.		
SE1025	FEM for Engineering Applications *At least one of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
SF1916	Probability Theory and Statistics *At least one of the Conditionally Elective courses must be chosen. Previous SF1901*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *At least one of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course *At least one of the Conditionally Elective courses must be chosen.*	9.0 hp	Second cycle

Recommended courses

Code	Name	Credits	Edu. level
SG1217	Fluid Mechanics, Basic Course *Can be replaced by SG1220*	6.0 hp	First cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Regarding MF130X and MF1025: Only one of the courses can be chosen.

Master, Industrial Management (INE)

Year 3

Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
ME2015	Project Management: Leadership and Control	6.0 hp	Second cycle
ME2063	Team Leadership and Human Resource Management	6.0 hp	Second cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science *At least 9 credits of the Conditionally Elective courses must be chosen.*	9.0 hp	First cycle
EL1010	Automatic Control, General Course *At least 9 credits of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
HM1025	Ergonomics in Product Development *At least 9 credits of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
MF1025	Model Based Product Development II *At least 9 credits of the Conditionally Elective courses must be chosen. At least 9 credits of the Conditionally Elective courses must be chosen. Not to be read if you have chosen MF130X*	6.0 hp	First cycle
MG1024	Production *At least 9 credits of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
MJ1401	Heat Transfer *At least 9 credits of the Conditionally Elective courses must be chosen.*	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle

	At least 9 credits of the Conditionally Elective courses must be chosen.		
SF1916	Probability Theory and Statistics *At least 9 credits of the Conditionally Elective courses must be chosen. Previous SF1901*	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *At least 9 credits of the Conditionally Elective courses must be chosen. SG1220 can be chosen instead*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *At least 9 credits of the Conditionally Elective courses must be chosen. SG1220 can be chosen instead of SG1217.*	6.0 hp	First cycle

Supplementary information

At least 9 hp of the conditionally elective courses must be chosen.

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Level

Notice: You need ***MG1024 Production*** for eligibility to the course ***MG2029 Production Engineering - Planning and Control,*** which is a mandatory course for students attending the Master's Programme Industrial Management (TINEM), Technical profile: Production

CDEPR-students at Masters programme, Industrial Management (TINEM)
A technical profile specified within the study year plan for Degree Programme in Design and Product Realisation must be chosen

One of the following profiles can be chosen:

- **Technical profile Construction**
  At least 18 credits from the course list below must be chosen
  MF2010 Component Design, 6 credits
  MF2011 Systems Engineering, 9 credits
  MF2019 CAD 3D-modelling and Visualization, 6 credits
  MF2024 Robust and Probabilistic Design, 6 credits

- **Technical profile Energy**
  MJ2413 Energy and Environment
  MJ2411 Renewable Energy Technology*
  MJ2380 Introduction to Energy Systems Analysis and Applications
  can also be chosen study year 5

- **Technical profile Production**
  MG2029 Production Engineering - Planning and Control

  One of the following two courses must be chosen:
  MG2028 CAD and Other IT Tools in Industrial Processes
  MG2130 Modelling and Simulation of Industrial Processes
  As well as one of the following courses must be chosen, either study year 4 or 5:
  MG2009 Advanced Manufacturing Technology
  MG2109 Advanced Manufacturing Technology, Extended Course
  MG2110 Advanced Metrology
  MG2022 Advanced CAD Modelling and Rapid Prototyping*
  MG2135 PLM - Product Lifecycle Management
  MG2036 Computer Aided Manufacturing - CAM
  MG2038 Digital Factories**
  MG2010 Modern Industrial Metrology*
  MG2028 prerequisites
  ****MG2130*** prerequisites

- **Technical profile Solid Mechanics**
  SE1025 FEM for Engineering Applications

  One of the following two courses must be chosen:
  SE2126 Material Mechanics
  SE2132 Applied Elasticity with FEM
  As well as one of the following courses must be chosen:
  SE2860 FEM Modelling
  SE2129 Fracture Mechanics and Fatigue
  SE2134 Dynamic Problems in Solid Mechanics
  SE2121 Introduction to Biomechanics

Track, Industrial Design Engineering (IPDC)

Year 3

Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level

HM1025	Ergonomics in Product Development	6.0 hp	First cycle
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1025	Model Based Product Development II *Not to be read if you choose MF130X due to overlap*	6.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Recommended courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics *Previous SF1901*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Regarding MF130X and MF1025: Only one of the courses can be chosen.

Track, Innovation Management and Product Development (IPDE)

Year 3

Mandatory courses (24.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Regarding MF130X and MF1025: Only one of the courses can be chosen.

Track, Combustion Engineering (IPUA)

Year 3

Mandatory courses (24.0 Credits)

Code	Name	Credits	Edu. level
EL1010	Automatic Control, General Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle

MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Track, Machine Design (IPUB)

Year 3

Mandatory courses (24.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Track, Mechatronics (IPUC)

Year 3

Mandatory courses (39.0 Credits)

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Master, Naval Architecture (MRS)

Year 3

Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu.

			level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *Can be replaced by SG1217*	6.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Master, Production Engineering and Management (PRM)

Year 3

Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Level

Master, Sustainable Energy Engineering (SUE)

Year 3

Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220.*	6.0 hp	First cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Level

Master, Sustainable Technology (SUT)

Year 3

Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
AL2113	Sustainable Development in theory and practise	6.0 hp	Second cycle
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Course MF1025: Can not be chosen with MF130X

Track, Fluid Mechanics (TEMA)

Year 3

Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *Can be replaced by SG1217*	6.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle

MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Track, Solid Mechanics (TEMB)

Year 3

Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Track, Sound and Vibrations (TEMC)

Year 3

Mandatory courses (24.0 Credits)

Code	Name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle
MF1040	Design and Product Realization Methodology	9.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1321	Applied Programming and Computer Science	9.0 hp	First cycle
EL1010	Automatic Control, General Course	6.0 hp	First cycle
HM1025	Ergonomics in Product Development	6.0 hp	First cycle
MF1025	Model Based Product Development II *Can not be chosen with MF130X*	6.0 hp	First cycle
MG1002	Automation Technology	6.0 hp	First cycle
MG1024	Production	6.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
SE1025	FEM for Engineering Applications	6.0 hp	First cycle
SF1916	Probability Theory and Statistics	6.0 hp	First cycle
SG1217	Fluid Mechanics, Basic Course *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SG1220	Fluid Mechanics for Engineers *SG1217 can be chosen instead of SG1220*	6.0 hp	First cycle
SK2371	Physics of Visual Impressions, Larger Course	9.0 hp	Second cycle

Supplementary information

One of the following degree project for a Degree of Bachelor must be chosen, independently of chosen masters programme:

- MF130X Degree Project in Machine Design, First Cycle
- MF131X Degree Project in Integrated Product Development, First Cycle
- MF133X Degree Project in Mechatronics, First Cycle
- MJ146X Degree Project in Technology and Sustainable Development, First Cycle
- AL126X Degree Project in Technology and Sustainable Development, First Cycle
- MG110X Degree Project in Production Engineering, First Cycle
- SA118X Degree Project in Mechanical Engineering, First Cycle

Appendix 2: Specialisations

Degree Programme in Design and Product Realisation (CDEPR)

Master, Aerospece Engineering (AEE)

No information entered.

Master, Vehicle Engineering (FOR)

No information entered.

Master, Industrial Management (INE)

No information entered.

Track, Industrial Design Engineering (IPDC)

No information entered.

Track, Innovation Management and Product Development (IPDE)

No information entered.

Track, Combustion Engineering (IPUA)

No information entered.

Track, Machine Design (IPUB)

No information entered.

Track, Mechatronics (IPUC)

No information entered.

Master, Naval Architecture (MRS)

No information entered.

Master, Production Engineering and Management (PRM)

No information entered.

Master, Sustainable Energy Engineering (SUE)

No information entered.

Master, Sustainable Technology (SUT)

No information entered.

Track, Fluid Mechanics (TEMA)

No information entered.

Track, Solid Mechanics (TEMB)

No information entered.

Track, Sound and Vibrations (TEMC)

No information entered.