



# Programme syllabus

[An accessible version of the syllabus can be found in the Course and programme directory.](#)

## Master's Programme, Industrial Engineering and Management 120 credits

Masterprogram, industriell ekonomi

*Valid for students admitted to the education from autumn 18 (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, there are also specific objectives for this Master's Programme. Graduates from the Master's Programme shall ...

#### Knowledge and understanding

- demonstrate in-depth knowledge of the scientific foundation and proven experience of technology within a selected engineering specialisation, as well as in industrial engineering and management.

- show insight into current research and development in the technological field of Industrial Engineering and Management.
- demonstrate advanced knowledge of how different types of established and new technology can support or further develop businesses.
- demonstrate knowledge of the management and development of businesses on the basis of different stakeholders and different perspectives, and demonstrate an understanding of potential areas of conflict in relation to this.
- demonstrate in-depth knowledge on the establishment, management, planning, monitoring and business development of various types of industrial and technology-based enterprises.
- demonstrate advanced knowledge of methods and scientific tools used to analyse, calculate, process and evaluate facts in the borderland between engineering, natural science and social science.

## Skills and abilities

- demonstrate the ability to, independently and in a group, apply knowledge and skills in practice while taking into account relevant scientific and professional assessments.
- demonstrate the ability to analyse, formulate, apply and develop technical and economic problems from several different perspectives, including the systems perspective.
- demonstrate the ability to set boundaries, determine resource consumption and manage processes for problem-solving and execution.
- demonstrate the capacity to, in both national and international contexts, both orally and in writing, in dialogue with different groups, clearly account for and discuss their conclusions and the knowledge and arguments on which these are based.
- demonstrate the ability to assess whether technical systems and activities contribute to the development of a sustainable society.

## Ability to make judgements and adopt a standpoint

- employ a reflective approach to accountability and ethical issues within technical, organisational, economic, ecological and social systems.
- demonstrate awareness of how personal values and attitudes influence the definition and assessments of technical, organisational and economic problems.
- demonstrate the ability to identify the need of further knowledge and take responsibility for continuously developing their knowledge and skills.

The KTH local Degree Ordinance can be found in the KTH regulatory framework, [www.kth.se](http://www.kth.se)

# Extent and content of the programme

The programme comprises 120 higher education credits, which corresponds to two years of full-time studies at a normal study pace (4 semesters).

The programme is offered in the second cycle and the language of instruction is English.

## Eligibility and selection

Eligibility for the Master's Programme in Industrial Engineering and Management requires general entry requirements corresponding to:

- a first-cycle higher education qualification – a Degree of Bachelor of Science within engineering, the subject field of industrial engineering and management, of at least 180 credits or an equivalent foreign qualification.
- English B/English 6 or equivalent

and special admission requirements equivalent to the course *ME1312 Understanding the Interface of Technology and Business/ or ME2302 Knowledge Formation in Technology and Natural Science*.

Otherwise refer to the KTH admission regulations in the KTH regulatory framework, [www.kth.se](http://www.kth.se)

## Implementation of the education

### Structure of the education

#### **Academic year**

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 <http://www.kth.se/student/schema>

#### **Years 1-2 – Specialisation in the second cycle**

The programme is characterised by courses in industrial engineering and management being taught in parallel with courses within the framework of a chosen technical track and programme-specific subject courses, mainly in the second cycle. Based on the technical focus of the student's first-cycle studies, the student chooses a technical track for the second cycle when applying to the Master's Programme. In addition there are elective courses.

The programme's structure means that the students undertake compulsory courses of 30 credits that belong to the main field of the chosen technical track, and 30 credits of courses belonging to the main field of industrial engineering and management. In addition, there is the possibility of taking optional courses of a varying number of credits depending on the technical track being pursued.

The programme concludes with a degree project in the second cycle, which comprises 30 credits and is equivalent to 20 weeks of full-time studies. To begin the degree project, second cycle, there are conditions and entry requirements. More information can be found in the official course syllabus. The degree project is carried out within the main field of industrial engineering and management.

**The academic year 2018/2019 offers the following technical tracks within the Master's Programme in Industrial Engineering and Management \***

***Computer Science and and Communications***

- Track, Interaction and visualization
- Track, Machine Learning
- Track, Software Engineering

***Energy Systems and Sustainable Development***

- Track, Sustainable Energy Utilization
- Track, Sustainable Power Generation

***Product Realisation***

- Track, Mechatronics Product Development
- Track, Integrated Production Engineering

***Mathematics***

- Track, Financial Mathematics
- Track, Optimization and Systems Theory

***\* The range of technical tracks may be revised. An updated list of technical tracks can be found on the KTH student web for each respective academic year.***

## Courses

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

The programme consists of compulsory, conditionally elective, recommended and optional courses. The compulsory courses are defined for each year and technical track in course lists. The goals, entry requirements, 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 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 the optional courses:***

- 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 used 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

Participation requires admission to courses within the programme and course registration. Course registration is done via the personal menu at [www.kth.se](http://www.kth.se)

For students starting their education from the autumn semester 2018, previous promotion requirements have been replaced with special admission requirements to each course. Admission requirements are specified in the course syllabus.

### **Application for courses within 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](http://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](http://www.antagning.se), the application is only considered subject to availability.

Information on how to apply for a course is obtained 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](http://www.kth.se) or pursuant to instructions from the school offering the course.

A student who is registered for 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 at [www.kth.se](http://www.kth.se)

## Recognition of previous academic studies

Students may apply to be given credit for results from a course or courses at another higher education institution/university within or outside the country. The entire KTH policy for credit transfer is included in the KTH regulatory framework, [www.kth.se](http://www.kth.se).

As the grading systems differ widely between countries, grades are not translated to the KTH grading scale.

Applications for credit transfer are made using a form that is submitted to the school's office of student affairs.

## Studies abroad

Students on the Master's Programme in Industrial Engineering and Management have the opportunity to study abroad through agreements KTH has with universities within and outside the EU. 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, second cycle*

The programme includes a degree project for a Degree of Master that comprises 30 credit.

The degree project is the final part of the education. The project work may begin when special admission requirements for the course are fulfilled.

In order to fulfill specific admission requirements for a Degree Project, second cycle, 30 credits, all courses in study year 1-3, first cycle, or courses required for the award of a Bachelors's degree, and courses corresponding to at least 60 credits, second cycle, must be completed. The courses at the second cycle, shall include courses in the programme relevant to the degree project, as well as courses in science theory and research methodology.

The degree project can be done within the main field of industrial engineering and management to attain a Degree of Master of Science in Industrial Engineering and Management.

KTH's comprehensive rules and guidelines for a degree project, 30 credits, for a Degree of Master can be found in the KTH regulatory framework.

<https://intra.kth.se/styrning/regelverk>

## Degree

### **Application for a degree**

The student must apply for a degree. Applications are made by personal login at [www.kth.se](http://www.kth.se)

The student is able to apply for a Degree of Master of Science if the requirements for such degree are met.

### ***Title of general qualification at second cycle***

Master of Science (120 credits)

### ***Teknologie masterexamen***

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

Courses whose content overlaps one or more other courses in the programme cannot be counted as part of the 120 credits that form the basis for the degree.

Refer to the KTH guidelines (KTH regulatory framework), local directions for higher education qualifications at first and second cycle, the local Degree Ordinance

<https://intra.kth.se/styrning/regelverk>

found in the KTH regulations, [intra.kth.se](http://intra.kth.se)

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



# Appendix 1: Course list

## Master's Programme, Industrial Engineering and Management (TIEMM)

### General courses

#### Year 1

#### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management, 300 higher education credits, takes place within framework of the Master program Industrial Engineering and Management - TIEMM

### Track, Computer Science (CSCJ)

#### Year 1

#### Supplementary information

**THE SPECIALISATION COMPUTER SCIENCE IS DORMANT FOR STUDENTS ADMITTED AUTUMN-18**

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM



## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
DH2465	Computer Science, Business and Management	15.0 hp	Second cycle
ME2002	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle

### Recommended courses

Code	Name	Credits	Edu. level
DA2210	Introduction to the Philosophy of Science and Research Methodology for Computer Scientists <i>The course DA2210 should be chosen instead of ME2002 for students who intend to do a degree project in Computer Science.</i>	6.0 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Computer Science.

The course DA2210 should be chosen instead of ME2002, only for students who intend to do a degree project in Computer Science.

The course list is based upon the curriculum for academic year 2017/2018. Changes may occur.

## Track, Sustainable Energy Utilization (EEAA)

### Year 1

### Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
ME2311	Leadership and Organizational Change	6.0 hp	Second cycle

<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle
<a href="#">MJ2141</a>	Energy Systems, Models and Scenarios	9.0 hp	Second cycle
<a href="#">MJ2407</a>	Sustainable Energy Utilisation	9.0 hp	Second cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">EG2210</a>	Electricity Market Analysis	7.5 hp	Second cycle
<a href="#">EG2220</a>	Power Generation, Environment and Markets	7.5 hp	Second cycle
<a href="#">ME2087</a>	Energy Business	6.0 hp	Second cycle
<a href="#">MJ2411</a>	Renewable Energy Technology	6.0 hp	Second cycle
<a href="#">MJ2437</a>	Modeling of Energy Systems - Energy Utilization	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

At least one of the conditionally elective courses MJ2437, MJ2411, EG2210, EG2220 or ME2087 should be chosen.

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2004</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle
<a href="#">MJ2146</a>	Energy Systems, Business and Management	15.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Sustainable Energy Utilization.

Course ME2004 replaces course ME2002

## Track, Financial Mathematics (FMIB)

Year 1

### Mandatory courses (40.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle
<a href="#">SF2942</a>	Portfolio Theory and Risk Management	7.5 hp	Second cycle
<a href="#">SF2943</a>	Time Series Analysis	7.5 hp	Second cycle
<a href="#">SF2980</a>	Risk Management	7.5 hp	Second cycle

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">SF2935</a>	Modern Methods of Statistical Learning	7.5 hp	Second cycle
<a href="#">SF2955</a>	Computer Intensive Methods in Mathematical Statistics	7.5 hp	Second cycle
<a href="#">SF2971</a>	Martingales and Stochastic Integrals	7.5 hp	Second cycle
<a href="#">SF2972</a>	Game Theory <i>The course SF2972 is next time given spring-19.</i>	7.5 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

At least one of the conditionally elective courses: SF2955, SF2972, SF2975 (year 2), SF2971, or SF2935 should be chosen.

The course SF2972 is next time given spring-19.

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2004</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle
<a href="#">ME2313</a>	Financial Mathematics, Business and Management	15.0 hp	Second cycle

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">SF2975</a>	Financial Derivatives	7.5 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Financial Mathematics.

Course ME2004 replaces ME2002.

## Track, Human-Computer Interaction (HCIE)

### Year 1

### Supplementary information

**THE SPECIALISATION HUMAN-COMPUTER INTERACTION IS DORMANT FOR STUDENTS ADMITTED AUTUMN-18**

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">DH2465</a>	Computer Science, Business and Management	15.0 hp	Second cycle
<a href="#">ME2002</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle

### Recommended courses

Code	Name	Credits	Edu. level
<a href="#">DM2711</a>	Research Methods in Interactive Media Technology <i>Should be chosen for students who intend to do a degree project in Human-Computer Interaction.</i>	9.0 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Human-Computer Interaction.

***DM2711 instead of ME2002 should be chosen for students who intend to do a degree project in Human-Computer Interaction.***

The course list is based upon the curriculum for academic year 2017/2018. Changes may occur.

## Track, Sustainable Power Generation (HKPA)

### Year 1

### Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle

<a href="#">MJ2141</a>	Energy Systems, Models and Scenarios	9.0 hp	Second cycle
<a href="#">MJ2405</a>	Sustainable Power Generation	9.0 hp	Second cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">EG2210</a>	Electricity Market Analysis	7.5 hp	Second cycle
<a href="#">EG2220</a>	Power Generation, Environment and Markets	7.5 hp	Second cycle
<a href="#">ME2087</a>	Energy Business	6.0 hp	Second cycle
<a href="#">MJ2411</a>	Renewable Energy Technology	6.0 hp	Second cycle
<a href="#">MJ2438</a>	Modeling of Energy Systems - Heat and Power Generation	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

At least one of the conditionally elective courses MJ2437, MJ2411, MJ2438, EG2220, EG2210 or ME2087 should be chosen.

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2004</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle
<a href="#">MJ2146</a>	Energy Systems, Business and Management	15.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

Degree project, advanced level, 30 credits, is a compulsory course during spring term within Industrial Management or the technical track Sustainable Power Generation.

Course ME2004 replaces ME2002.

# Track, Interaction and Visualization (IAVN)

## Year 1

### Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">DD2380</a>	Artificial Intelligence	6.0 hp	Second cycle
<a href="#">DD2395</a>	Computer Security <i>CINEK students chose DD1389 instead if DD2395 was attended year 3</i>	6.0 hp	Second cycle
<a href="#">DH2628</a>	Interaction Design Methods	7.5 hp	Second cycle
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DH2323</a>	Computer Graphics and Interaction	6.0 hp	Second cycle
<a href="#">DH2400</a>	Physical Interaction Design and Realization	7.5 hp	Second cycle
<a href="#">DH2642</a>	Interaction Programming and the Dynamic Web	7.5 hp	Second cycle
<a href="#">DH2670</a>	Haptics, Tactile and Tangible Interaction	7.5 hp	Second cycle
<a href="#">DT2112</a>	Speech Technology	7.5 hp	Second cycle
<a href="#">DT2140</a>	Multimodal Interaction and Interfaces	7.5 hp	Second cycle
<a href="#">DT2213</a>	Musical Communication and Music Technology	7.5 hp	Second cycle
<a href="#">DT2300</a>	Sound in Interaction	7.5 hp	Second cycle

### Recommended courses

Code	Name	Credits	Edu. level
<a href="#">DH2320</a>	Introduction to Visualization and Computer Graphics <i>Compulsory within Master degree in Computer Science</i>	6.0 hp	Second cycle
<a href="#">DH2408</a>	Evaluation Methods in Human-Computer Interaction <i>Compulsory within Master degree in Computer Science</i>	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

*New track as from autumn 2018*

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
DH2465	Computer Science, Business and Management	15.0 hp	Second cycle
ME2004	Research Methods in Industrial Engineering and Management <i>DA2210 should be chosen instead if you will do the Master thesis work in Computer Science</i>	7.5 hp	Second cycle

### Recommended courses

Code	Name	Credits	Edu. level
DA2210	Introduction to the Philosophy of Science and Research Methodology for Computer Scientists <i>ME2002 should be chosen instead if you will do the Master thesis work at Indek</i>	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

Track Interaction and Visualization is a new track for students admitted to TIEMM as from autumn 2018

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Interaction and visualization.

Course ME2004 should be chosen instead of DA2210 if you will do the Master thesis work at Indek.

Course ME2004 replaces course ME2002.



# Track, Integrated Production Engineering (IPIB)

## Year 1

### Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle
<a href="#">MG2028</a>	CAD and Other IT Tools in Industrial Processes	6.0 hp	Second cycle
<a href="#">MG2029</a>	Production Engineering - Planning and Control	6.0 hp	Second cycle

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">MG2020</a>	Modularisation of Products <i>* One of the courses MG2020 or MG2040 must be chosen.</i>	6.0 hp	Second cycle
<a href="#">MG2040</a>	Assembly Technology <i>* One of the courses MG2020 or MG2040 must be chosen.</i>	6.0 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

One of the conditionally elective courses MG2020 or MG2040 must be chosen.

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2004</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle
<a href="#">MG2117</a>	Production, Business and Management	15.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

Degree project, advanced level, 30 credits, is a mandatory course during the spring term within Industrial Management or the technical track Integrated Production Engineering.

Course ME2004 replaces ME2002.

## Track, Machine Learning (MAIG)

### Year 1

### Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">DD2380</a>	Artificial Intelligence	6.0 hp	Second cycle
<a href="#">DD2395</a>	Computer Security <i>CINEK students chose DD1389 instead if DD2395 was attended year 3</i>	6.0 hp	Second cycle
<a href="#">DD2421</a>	Machine Learning	7.5 hp	Second cycle
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DD2410</a>	Introduction to Robotics *2	7.5 hp	Second cycle
<a href="#">DD2423</a>	Image Analysis and Computer Vision *2	7.5 hp	Second cycle
<a href="#">DD2424</a>	Deep Learning in Data Science *1	7.5 hp	Second cycle
<a href="#">DD2429</a>	Computational Photography *2	6.0 hp	Second cycle
<a href="#">DD2434</a>	Machine Learning, Advanced Course	7.5 hp	Second cycle

	*1		
DD2437	Artificial Neural Networks and Deep Architectures *1	7.5 hp	Second cycle
DD2447	Statistical Methods in Applied Computer Science *1	6.0 hp	Second cycle
DD2476	Search Engines and Information Retrieval Systems *2	9.0 hp	Second cycle
DT2112	Speech Technology *2	7.5 hp	Second cycle
DT2119	Speech and Speaker Recognition *2	7.5 hp	Second cycle
EL2320	Applied Estimation *1	7.5 hp	Second cycle
EQ2340	Pattern Recognition *1	7.5 hp	Second cycle

## Recommended courses

Code	Name	Credits	Edu. level
DH2320	Introduction to Visualization and Computer Graphics <i>Compulsory within Master degree in Computer Science</i>	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

Track Machine Learning is a new track for students admitted to TIEMM as from autumn 2018

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
DH2465	Computer Science, Business and Management	15.0 hp	Second cycle
ME2004	Research Methods in Industrial Engineering and Management <i>DA2210 should be chosen instead if you will do the Master thesis work within Computer Science.</i>	7.5 hp	Second cycle

## Recommended courses

Code	Name	Credits	Edu. level
<a href="#">DA2210</a>	Introduction to the Philosophy of Science and Research Methodology for Computer Scientists <i>ME2002 should be chosen instead if you will do the Master thesis work at Indek</i>	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Machine Learning.

Course ME2004 should be chosen instead of DA2210 if you will do the Master thesis work at Indek

The course ME2004 replaces course ME2002

## Track, Mechatronics Product Development (MPUA)

### Year 1

### Mandatory courses (42.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle
<a href="#">MF2007</a>	Dynamics and Motion Control	9.0 hp	Second cycle
<a href="#">MF2030</a>	Mechatronics basic Course	6.0 hp	Second cycle
<a href="#">MF2103</a>	Embedded Systems for Mechatronics	9.0 hp	Second cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">MF2079</a>	Mechatronics, Business and Management, extended course <i>MF2079 can replace MF2050 which starts year 2</i>	18.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

A new course, MF2103 shall be attended in period 3

The course MF2079 can replace MF2050, which starts year 2.

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2004</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle
<a href="#">MF2050</a>	Mechatronics, Business and Management	15.0 hp	Second cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">MF2079</a>	Mechatronics, Business and Management, extended course <i>You begin the course year 1, period 4</i>	18.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Mechatronics Product Development.

The course ME2004 replaces ME2002.

# Track, Optimization and Systems Theory (OSYT)

Year 1

## Mandatory courses (33.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle
<a href="#">SF2812</a>	Applied Linear Optimization	7.5 hp	Second cycle
<a href="#">SF2832</a>	Mathematical Systems Theory	7.5 hp	Second cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">SF2822</a>	Applied Nonlinear Optimization	7.5 hp	Second cycle
<a href="#">SF2842</a>	Geometric Control Theory	7.5 hp	Second cycle
<a href="#">SF2852</a>	Optimal Control Theory	7.5 hp	Second cycle
<a href="#">SF2935</a>	Modern Methods of Statistical Learning	7.5 hp	Second cycle
<a href="#">SF2942</a>	Portfolio Theory and Risk Management	7.5 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

At least two of the conditionally elective courses SF2822, SF2842, SF2852, SF2935 and SF2942 should be chosen.

## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">ME2004</a>	Research Methods in Industrial Engineering and Management	7.5 hp	Second cycle
<a href="#">ME2314</a>	Systems Engineering, Business and Management, Part 2	7.5 hp	Second cycle
<a href="#">SF2868</a>	Systems Engineering, Business and Management, Part 1	7.5 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM

Degree project, advanced level, 30 credits, is a compulsory course during spring term within Industrial Management or the technical track Optimization and Systems Theory.

The course ME2004 replaces course ME2002.

## Track, Software Engineering (PUET)

### Year 1

### Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">DD2380</a>	Artificial Intelligence	6.0 hp	Second cycle
<a href="#">DD2395</a>	Computer Security <i>CINEK students chose DD1389 instead if DD2395 was attended year 3</i>	6.0 hp	Second cycle
<a href="#">DD2480</a>	Software Engineering Fundamentals	7.5 hp	Second cycle
<a href="#">ME2311</a>	Leadership and Organizational Change	6.0 hp	Second cycle
<a href="#">ME2312</a>	Advanced Studies in Industrial Economics and Management	12.0 hp	Second cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
DD2350	Algorithms, Data Structures and Complexity *1	9.5 hp	Second cycle
DD2440	Advanced Algorithms *1	6.0 hp	Second cycle
DD2448	Foundations of Cryptography *2	7.5 hp	Second cycle
DD2459	Software Reliability *1	7.5 hp	Second cycle
DD2460	Software Safety and Security *2	7.5 hp	Second cycle
DD2481	Principles of Programming Languages *2	7.5 hp	Second cycle
DD2487	Large-Scale Software Development *2	7.5 hp	Second cycle
DD2496	Privacy Enhancing Technologies *2	7.5 hp	Second cycle
DH2642	Interaction Programming and the Dynamic Web *2	7.5 hp	Second cycle
IK2218	Protocols and Principles of the Internet *1	6.0 hp	Second cycle

## Recommended courses

Code	Name	Credits	Edu. level
DH2320	Introduction to Visualization and Computer Graphics <i>Compulsory within Master degree in Computer Science</i>	6.0 hp	Second cycle

## Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

Track Software Engineering is a new track for students admitted to TIEMM as from autumn 2018



## Year 2

### Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
DH2465	Computer Science, Business and Management	15.0 hp	Second cycle
ME2004	Research Methods in Industrial Engineering and Management <i>DA2210 should be chosen instead if you will do the Master thesis work in Computer Science</i>	7.5 hp	Second cycle

### Recommended courses

Code	Name	Credits	Edu. level
DA2210	Introduction to the Philosophy of Science and Research Methodology for Computer Scientists <i>ME2002 should be chosen instead if you will do the Master thesis work at Indek</i>	6.0 hp	Second cycle

### Supplementary information

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within framework of the Master program Industrial Engineering and Management - TIEMM.

***Track, Software Engineering - a new track as from batch -18 at TIEMM.***

Degree project, advanced level, 30 credits, is a compulsory course during the spring term within Industrial Management or the technical track Software Engineering.

Course ME2004 should be chosen instead of DA2210 if you will do the Master thesis work at Indek

The course ME2004 replaces course ME2002



# Appendix 2: Specialisations

Master's Programme, Industrial Engineering and Management (TIEMM)

Track, Computer Science (CSCJ)

No information entered.

Track, Sustainable Energy Utilization (EEAA)

No information entered.

Track, Financial Mathematics (FMIB)

No information entered.

Track, Human-Computer Interaction (HCIE)

No information entered.

Track, Sustainable Power Generation (HKPA)

No information entered.

## Track, Interaction and Visualization (IAVN)

No information entered.

## Track, Integrated Production Engineering (IPIB)

No information entered.

## Track, Machine Learning (MAIG)

No information entered.

## Track, Mechatronics Product Development (MPUA)

No information entered.

## Track, Optimization and Systems Theory (OSYT)

No information entered.

## Track, Software Engineering (PUET)

No information entered.