Programme syllabus

Degree Programme in Industrial Engineering and Management
Civilingenjörsutbildning i industriell ekonomi
300.0 credits

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, a graduate within Master of Science in Engineering from Industrial Engineering and Management at KTH shall:

Knowledge and understanding

- demonstrate deep knowledge within mathematics, natural science and technology within a selected technical specialisation.
- demonstrate deep knowledge of industrial engineering and management and the relationship of technology-economy-society.
- demonstrate knowledge of how economic activities and their legal and institutional framework can be described, measured, developed and managed.
- demonstrate knowledge of how different types of established and new technology can support or further develop businesses.
- demonstrate knowledge of established methods, models and theories within the field of management in order to initiate, plan, develop, monitor and manage different types of industrial and technology-based businesses.
- demonstrate knowledge of the management and development of businesses on the basis of different stakeholder standpoints and different perspectives, and demonstrate an understanding of potential areas of conflict in relation to this.
- demonstrate knowledge of scientific tools used to analyse, process and evaluate facts, and an awareness of how knowledge is developed within natural science, engineering 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 ability to assess whether technical systems and activities contribute to the development of a sustainable society.
- possess the requisite personal and professional skills, such as in the area of leadership, project management, teamwork and communication, to work as an engineer in a management position or as a leader within a technology-intensive company.
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 a critical approach to methods and theories, and to how knowledge is developed within natural science, engineering and social science.

The KTH local Degree Ordinance can be found in the KTH regulatory framework, www.kth.se

Extent and content of the programme

The Degree Programme in Industrial Engineering and Management 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 begins a Master's programme.

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

Within the programme there are four technical specialisations in the first cycle. These technical specialisations provide eligibility for different technical tracks within the Master's Programme in Industrial Engineering and Management.

The academic year 2018/2019 offers the following technical specialisations for the Degree Programme in Industrial Engineering and Management *

- Computer Science and Communications
- Energy Systems and Sustainable Development
- Product Realisation
- Mathematics

* The range of technical specialisations may be revised. An updated list of technical specialisations 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 is mainly Swedish, but the language of instruction in the second cycle for the final two years is predominantly English.

Eligibility and selection

Admission to the Degree Programme in Industrial Engineering and Management 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, https://intra.kth.se/styrning/regelverk/utbildning-pa-grund-och-avancerad-niva-1.660818

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

Year 1-3 - First-cycle studies
The programme is undertaken within the technical field of Industrial Engineering and Management. The technical field of Industrial Engineering and Management consists of a combination of the subject industrial engineering and management together with another technical subject.

The programme's first cycle begins with a number of basic course in mathematics and natural science, industrial engineering and management, and programme-specific subject courses. Starting in year two, course within the chosen technical specialisation are also undertaken.

The first three years conclude with a first-cycle degree project of 15 credits which is carried out within the framework of a course at the engineering department responsible for other technology courses in the chosen specialisation, in cooperation with the Department of Industrial Economics and Management. To begin the first-cycle degree project, there are conditions and entry requirements. More information can be found in the official course syllabus.

Year 4-5 – Second-cycle specialised study
The final two years of the Degree Programme in Industrial Engineering and Management take place within the framework of the Master's Programme in Industrial Engineering and Management and involve second-cycle specialised study. The technical specialisation pursued in the first cycle provides the student the opportunity to choose between two technical tracks in the Master's Programme in Industrial Engineering and Management. The specialised study includes courses within industrial engineering and management, the chosen technical track and programme-specific subject courses, primarily second cycle. In addition there are completely elective courses.

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 second-cycle degree project, there are conditions and entry requirements. More information can be found in the official course syllabus.

The degree project can be carried out within the main field of industrial engineering and management or within the main field of study for the technical track. In this way, the student themselves can steer the option of applying for a general Degree of Master in industrial engineering and management or one within their technical track.

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 specialisation 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 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 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

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

- 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.

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 or according 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

**Choice of technical specialisation**

Choice of technical specialisation is made during the autumn semester of year 2. Eligibility for choosing a technical specialisation in year 2 requires the student to have passed

- at least 45 credits of the compulsory courses in year 1 of the Degree Programme in Industrial Engineering and Management by the end of the examination period in August.

In the first cycle, there is no restriction on the number of places in the technical specialisations.
Choice of Master's programme – technical track within the Master's Programme in Industrial Engineering and Management

Prior to year 4, the student chooses a second-cycle Master's programme within the framework of their Degree Programme. Students on the Degree Programme in Industrial Engineering and Management also choose a technical track within the Master's programme.

Choice of Master's programme is made during the period 1-15 May.

Information on how to apply for a Master's programme is obtained from the school's office of student affairs.

Requirements for Master's Programme:

According to the KTH Admission regulations 2018 (Dnr. V-2017-1014)
"In order to be eligible for advanced level studies within the integrated Master of Science programmes at KTH, you are required to complete 150 credits from year one through three. Of these, 110 credits must be from the year 1 and 2 curriculum. In addition to these credits, the bachelor thesis needs to be completed before Master’s level studies commence."

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.

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 Degree Programme in Industrial Engineering and Management have the opportunity to study abroad through agreements KTH has with universities within and outside the EU. Exchange studies cannot be pursued during the first and 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 Industrial Engineering and Management includes a degree project for a Degree of Bachelor of Science which comprises 15 credits.

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, first cycle, courses corresponding to at least 135 credits within the study programme, study year 1-3, first cycle, must be completed.

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 Industrial Engineering and Management includes a degree project for a Degree in Master of Science in Engineering, which comprises 30 credits.

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.

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 Industrial Engineering and Management, 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 Industrial Engineering and Management 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 Industrial Engineering and Management (CINEK), Programme syllabus for studies starting in autumn 2018

**General courses**

**Year 1**

**Mandatory courses (60.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1315</td>
<td>Programming Techniques and Matlab</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1306</td>
<td>Industrial Project Management</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1314</td>
<td>Introduction to Industrial Engineering and Management</td>
<td>9.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1315</td>
<td>Industrial Marketing for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1624</td>
<td>Algebra and Geometry</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1625</td>
<td>Calculus in One Variable</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1626</td>
<td>Calculus in Several Variable</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SG1109</td>
<td>Mechanics</td>
<td>8.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

**Recommended courses**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF0003</td>
<td>Introductory Course in Mathematics</td>
<td>1.5</td>
<td>Pre-university level</td>
</tr>
</tbody>
</table>

*Given in August. Not included in the degree.*

**Year 2**

**Supplementary information**

Information is based upon the curriculum for academic year 2018/2019. Changes may occur.
### Year 3

### Year 4

### Year 5

#### Computer Science and Communications (DKOI)

**Year 1**

**Year 2**

**Mandatory courses (61.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1320</td>
<td>Applied Computer Science</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1377</td>
<td>Low Level Programming and Computer Architecture</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DH1620</td>
<td>Human-Computer Interaction, Introductory Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1316</td>
<td>Quantitative Business and Operations Analytics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1633</td>
<td>Differential Equations I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1918</td>
<td>Probability Theory and Statistics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SK1110</td>
<td>Electromagnetism and Waves</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

**Year 3**

**Mandatory courses (60.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1334</td>
<td>Database Technology</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1385</td>
<td>Software Engineering</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1389</td>
<td>Internet Programming</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1396</td>
<td>Parallel and Concurrent Programming in Introduction to Computer Science</td>
<td>3.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1418</td>
<td>Language Engineering with Introduction to Machine Learning</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD152X</td>
<td>Degree Project in Computer Science, Communication and Industrial Management, First Level</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>
# Supplementary information

The course list is based upon the curriculum for academic year 2019/2020. Changes may occur.

*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*

See Course and Programme Directory: Master's Programme, Industrial Engineering and Management - TIEMM

[www.kth.se/student/kurser/program/tiemm/](http://www.kth.se/student/kurser/program/tiemm/)

## Year 4

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## Year 5

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## Energy Systems and Sustainable Development (EHUI)

### Year 1

### Year 2

**Mandatory courses (60.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
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<tbody>
<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1316</td>
<td>Quantitative Business and Operations Analytics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ1112</td>
<td>Applied Thermodynamics</td>
<td>9.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>Course code</td>
<td>Course name</td>
<td>Credits</td>
<td>Edu. level</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------</td>
<td>---------</td>
<td>--------------------</td>
</tr>
<tr>
<td>MJ1145</td>
<td>Energy Systems</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1633</td>
<td>Differential Equations I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1918</td>
<td>Probability Theory and Statistics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SK1110</td>
<td>Electromagnetism and Waves</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
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</table>

**Year 3**

**Mandatory courses (61.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG2205</td>
<td>Power Generation Operation and Planning</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME1310</td>
<td>Economics for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1311</td>
<td>Corporate Finance</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1313</td>
<td>Industrial and Technical Transformation</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MF1017</td>
<td>Basic Electrical Engineering</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ1141</td>
<td>Energy Systems and Sustainability</td>
<td>9.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ1401</td>
<td>Heat Transfer</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ148X</td>
<td>Degree Project in Energy Systems, Sustainability</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

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**Year 4**

**Supplementary information**

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### Year 5

**Supplementary information**

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See Course and programme directory: Master program Industrial Engineering and Management - TIEMM (Industrial Engineering and Management):

www.kth.se/student/kurser/program/tiemm/

### Product Realisation (PFRI)

#### Year 1

#### Year 2

**Mandatory courses (60.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1316</td>
<td>Quantitative Business and Operations Analytics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MF1016</td>
<td>Basic Electrical Engineering</td>
<td>9.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MF1039</td>
<td>Design and Product Realization, Components</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>MG1028</td>
<td>Introductory 3D CAD</td>
<td>1.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1633</td>
<td>Differential Equations I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1918</td>
<td>Probability Theory and Statistics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SK1110</td>
<td>Electromagnetism and Waves</td>
<td>7.5</td>
<td>First cycle</td>
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</table>

#### Year 3

**Mandatory courses (60.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1320</td>
<td>Applied Computer Science</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1324</td>
<td>Applied Programming and Computer Science, Part 2</td>
<td>3.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>EL1010</td>
<td>Automatic Control, General Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1310</td>
<td>Economics for I</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1311</td>
<td>Corporate Finance</td>
<td>6.0</td>
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</tr>
<tr>
<td>ME1313</td>
<td>Industrial and Technical Transformation</td>
<td>6.0</td>
<td>First cycle</td>
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</tbody>
</table>
### Supplementary information

The course list is based upon the curriculum for academic year 2019/2020. Changes may occur.

Degree project, first cycle, within technical track Product Realisation. Admitted students may choose a degree project directed to production or mechatronics.

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See Course and Programme Directory: Master's Programme, Industrial Engineering and Management - TIEMM

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### Year 4

**Supplementary information**

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### Year 5

**Supplementary information**

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### Mathematics (TMAI)

#### Year 1

#### Year 2

### Mandatory courses (60.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
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<th>Edu. level</th>
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<tr>
<td>DD1320</td>
<td>Applied Computer Science</td>
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<tr>
<td>MG1002</td>
<td>Automation Technology</td>
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<td>MG1026</td>
<td>Manufacturing Technology</td>
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<tr>
<td>MG115X</td>
<td>Degree Project in Product Realization and Industrial Engineering, First Cycle</td>
<td>15.0</td>
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<td>Course code</td>
<td>Course name</td>
<td>Credits</td>
<td>Edu. level</td>
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<td>ME1308</td>
<td>Operations Strategy for I</td>
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<td>ME1309</td>
<td>Industrial Management Control for I</td>
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<tr>
<td>ME1316</td>
<td>Quantitative Business and Operations Analytics</td>
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<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
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<td>SF1633</td>
<td>Differential Equations I</td>
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<td>SF1904</td>
<td>Markov Processes, Basic Course</td>
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<td>SF1918</td>
<td>Probability Theory and Statistics</td>
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<td>SF2701</td>
<td>Financial Mathematics, Basic Course</td>
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<td>SK1110</td>
<td>Electromagnetism and Waves</td>
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**Year 3**

**Mandatory courses (61.5 credits)**

<table>
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<th>Course name</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Economics for I</td>
<td>6.0</td>
<td>First cycle</td>
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<tr>
<td>ME1311</td>
<td>Corporate Finance</td>
<td>6.0</td>
<td>First cycle</td>
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<td>ME1313</td>
<td>Industrial and Technical Transformation</td>
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<td>First cycle</td>
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<tr>
<td>SF100X</td>
<td>Degree Project in Applied Mathematics and Industrial Economics, First Cycle</td>
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<tr>
<td>SF1811</td>
<td>Optimization</td>
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<td>SF2863</td>
<td>Systems Engineering</td>
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<td>SF2930</td>
<td>Regression Analysis</td>
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</tr>
<tr>
<td>SF2940</td>
<td>Probability Theory</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

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**Year 4**

**Supplementary information**

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Year 5

Supplementary information

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Appendix 2: Specialisations

Degree Programme in Industrial Engineering and Management (CINEK), Programme syllabus for studies starting in autumn 2018

Computer Science and Communications (DKOI)

Energy Systems and Sustainable Development (EHUI)

Product Realisation (PFRI)

Mathematics (TMAI)