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 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 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](http://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 2016/2017 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](http://www.uhr.se)*

For entry requirements and selection principles, see the KTH admission regulations, [https://intra.kth.se/regelverk](https://intra.kth.se/regelverk)

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](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

Semester registration

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

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.*

In addition to the general conditions for participation in the teaching of studies in year 4/year 1 of the Master's programme, there are special entry requirements for the Master's programme. The assessment of the conditions and special entry requirements is performed by the Department of Student Services at the Student's Office, KTH.

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

*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.

The following applies:

*Requirements from year 1 to year 2:*

- At least 45 credits from year 1

should 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 Industrial Engineering and Management.

*Requirements 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,

should 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 Industrial Engineering and Management.

*Requirements from year 3 to year 4/year 1 of the Master's Programme:*

- At least 150 credits from years 1-3, of which
- at least 110 credits are from years 1-2, and
- the course ME1312 Understanding the Interface of Technology and Business (6 credits) and a Bachelor's degree project (15 credits),

should 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 Industrial Engineering and Management.

*Requirements from year 4 to year 5/year 1 to year 2 of the Master's Programme:*
In addition to the requirements for year 4/year 1 of the Master's Programme,

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

should 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 Industrial Engineering and Management.

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

**Individual study plan**
A student who does not fulfil the above requirements must, in consultation with the programme study advisor, establish an individual study plan for the continuing studies.

There are no guarantees for full-time studies for students with an individual study plan.

*See the KTH regulatory framework:*
https://intra.kth.se/regelverk

**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 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 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 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 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 2016

## 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 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1305</td>
<td>Introduction to Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1306</td>
<td>Industrial Project Management</td>
<td>7.5 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1307</td>
<td>Industrial Marketing for I</td>
<td>7.5 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1624</td>
<td>Algebra and Geometry</td>
<td>7.5 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1625</td>
<td>Calculus in One Variable</td>
<td>7.5 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1626</td>
<td>Calculus in Several Variable</td>
<td>7.5 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SG1109</td>
<td>Mechanics</td>
<td>8.0 hp</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

**Optional 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 fup</td>
<td>Pre-university level</td>
</tr>
</tbody>
</table>

### Year 2

**Supplementary information**

Information is based upon the curriculum for academic year 2016/2017. Changes may occur.

## Computer Science and Communications (DKOI)

### 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 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1377</td>
<td>Low Level Programming and Computer Architecture</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>DH1620</td>
<td>Human-Computer Interaction, Introductory Course</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1312</td>
<td>Understanding the Interface of Technology and Business</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1633</td>
<td>Differential Equations I</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1901</td>
<td>Probability Theory and Statistics</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>SK1110</td>
<td>Electromagnetism and Waves</td>
<td>7.5 hp</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 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1385</td>
<td>Software Engineering</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td></td>
<td>Replaces DD2385</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD1389</td>
<td>Internet Programming</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1396</td>
<td>Parallel and Concurrent Programming in Introduction to Computer Science</td>
<td>3.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD1418</td>
<td>Language Engineering with Introduction to Machine Learning</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td></td>
<td>Replaces DD2418</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD152X</td>
<td>Degree Project in Computer Science, Communication and Industrial Management, First Level</td>
<td>15.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1310</td>
<td>Economics for I</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1311</td>
<td>Corporate Finance</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1313</td>
<td>Industrial and Technical Transformation</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

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

See Course and Programme Directory: Master's Programme, Industrial Engineering and Management - TIEMM
The course DD2395 has been moved to TIEMM year 1 (CINEK year 4)

Course DD1389 has been moved from TIEMM year 1 to CINEK year 3.

Course DD1385 (previous course code DD2385 moved to year 3 as from students starting the program autumn-16)

Year 4

Supplementary information

Studierna på avancerad nivå, årskurs 4 och 5, inom civilingenjörsprogrammet Industriell ekonomi, 300hp, sker inom ramen för masterprogrammet Industriell ekonomi - TIEMM (Industrial Engineering and Management).

Se Kurs- och programkatalogen: Masterprogram Industriell ekonomi - TIEMM (Industrial Engineering and Management):

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

Year 5

Supplementary information

Studierna på avancerad nivå, årskurs 4 och 5, inom civilingenjörsprogrammet Industriell ekonomi, 300hp, sker inom ramen för masterprogrammet Industriell ekonomi - TIEMM (Industrial Engineering and Management).

Se Kurs- och programkatalogen: Masterprogram Industriell ekonomi - TIEMM (Industrial Engineering and Management):

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

Energy Systems and Sustainable Development (EHUI)

Year 2

Mandatory courses (60.0 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
<td>6.0 hp First cycle</td>
</tr>
</tbody>
</table>
**ME1312**  Understanding the Interface of Technology and Business  
6.0 hp  First cycle

**MJ1112**  Applied Thermodynamics  
9.0 hp  First cycle

**MJ1145**  Energy Systems  
7.5 hp  First cycle

**SF1545**  Numerical Methods, Basic Course  
6.0 hp  First cycle

**SF1633**  Differential Equations I  
6.0 hp  First cycle

**SF1901**  Probability Theory and Statistics  
6.0 hp  First cycle

**SK1110**  Electromagnetism and Waves  
7.5 hp  First cycle

### 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 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME1310</td>
<td>Economics for I</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1311</td>
<td>Corporate Finance</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1313</td>
<td>Industrial and Technical Transformation</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>MF1017</td>
<td>Basic Electrical Engineering</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ1141</td>
<td>Energy Systems and Sustainability</td>
<td>9.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ1401</td>
<td>Heat Transfer</td>
<td>6.0 hp</td>
<td>First cycle</td>
</tr>
<tr>
<td>MJ148X</td>
<td>Degree Project in Energy Systems, Sustainability and Industrial</td>
<td>15.0 hp</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

**Supplementary information**

New course spring 2019: MJ148X replaces MJ146X

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

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

### Year 4

**Supplementary information**

Studies on advanced level, year 4 and 5, within the MSc in Engineering programme Industrial Engineering and Management takes place within the Master program Industrial Engineering and Management - TIEMM
See Course and programme directory: Master program Industrial Engineering and Management - TIEMM (Industrial Engineering and Management):

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

**Year 5**

**Supplementary information**

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

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

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

**Product Realisation (PFRI)**

**Year 2**

**Mandatory courses (60.0 Credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>ME1312</td>
<td>Understanding the Interface of Technology and Business</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>MF1016</td>
<td>Basic Electrical Engineering</td>
<td>9.0 hp First cycle</td>
</tr>
<tr>
<td>MF1039</td>
<td>Design and Product Realization, Components</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>MG1028</td>
<td>Introductory 3D CAD</td>
<td>1.5 hp First cycle</td>
</tr>
<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>SF1633</td>
<td>Differential Equations I</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>SF1901</td>
<td>Probability Theory and Statistics</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>SK1110</td>
<td>Electromagnetism and Waves</td>
<td>7.5 hp 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 Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1320</td>
<td>Applied Computer Science</td>
<td>6.0 hp First cycle</td>
</tr>
<tr>
<td>DD1324</td>
<td>Applied Programming and Computer Science, Part 2</td>
<td>3.0 hp First cycle</td>
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</table>
EL1010  Automatic Control, General Course          6.0 hp  First cycle
ME1310  Economics for I                          6.0 hp  First cycle
ME1311  Corporate Finance                       6.0 hp  First cycle
ME1313  Industrial and Technical Transformation 6.0 hp  First cycle
MG1002  Automation Technology                  6.0 hp  First cycle
MG1026  Manufacturing Technology               6.0 hp  First cycle
MG115X  Degree Project in Product Realization and Industrial Engineering, First Cycle 15.0 hp  First cycle

Supplementary information

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

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

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Year 4

Supplementary information

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Year 5

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

See Course and Programme Directory: Master's Programme, Industrial Engineering and Management - TIEMM
# Mathematics (TMAI)

## 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>DD1320</td>
<td>Applied Computer Science</td>
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<tr>
<td>ME1308</td>
<td>Operations Strategy for I</td>
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<tr>
<td>ME1309</td>
<td>Industrial Management Control for I</td>
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<td>ME1312</td>
<td>Understanding the Interface of Technology and Business</td>
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<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0 hp</td>
<td>First cycle</td>
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<tr>
<td>SF1633</td>
<td>Differential Equations I</td>
<td>6.0 hp</td>
<td>First cycle</td>
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<td>SF1901</td>
<td>Probability Theory and Statistics</td>
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<td>SF1904</td>
<td>Markov Processes, Basic Course</td>
<td>3.0 hp</td>
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<tr>
<td>SF2701</td>
<td>Financial Mathematics, Basic Course</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SK1110</td>
<td>Electromagnetism and Waves</td>
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<td>First cycle</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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<th>Edu. level</th>
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</thead>
<tbody>
<tr>
<td>ME1310</td>
<td>Economics for I</td>
<td>6.0 hp</td>
<td>First cycle</td>
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<tr>
<td>ME1311</td>
<td>Corporate Finance</td>
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<tr>
<td>ME1313</td>
<td>Industrial and Technical Transformation</td>
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<tr>
<td>SF100X</td>
<td>Degree Project in Applied Mathematics and Industrial Economics, First Cycle</td>
<td>15.0 hp</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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<td>Probability Theory</td>
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<td>Second cycle</td>
</tr>
</tbody>
</table>

### Supplementary information

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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 2016

Computer Science and Communications (DKOI)

Energy Systems and Sustainable Development (EHUI)

Product Realisation (PFRI)

Mathematics (TMAI)