Programme syllabus

Master's Programme, Industrial Engineering and Management, 120 credits
Masterprogram, industriell ekonomi
120.0 credits

Valid for students admitted to the education from autumn 17 (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

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

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 2017/2018 offers the following technical tracks within the Master's Programme in Industrial Engineering and Management *
Computer Science and and Communications

- Track, Computer Science
- Track, Human-Computer Interaction

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

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 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

**Conditions for participation in the instruction**

For studies in the next year, there are certain requirements according to the programme's course list.

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

The following applies:

**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 Master's 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 guaranties for full-time studies for students with an individual study plan.

See the KTH regulatory framework:
https://intra.kth.se/styrning/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 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 credits and which is usually carried out in the spring semester of year 2.

Commencement of the degree project requires that the majority of the studies in the Master's Programme are completed, i.e.,

- that 60 credits have been obtained, of which 30 credits relate to specialised studies in the second cycle within the main field of study.

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 where “Application for degree” is found under the heading “Programme”.

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)
Teknologiemasterexamen

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

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions
Appendix 1: Course list

Master's Programme, Industrial Engineering and Management, 120 credits (TIEMM), Programme syllabus for studies starting in autumn 2017

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

Year 2

Track, Computer Science (CSCJ)

Year 1

Mandatory courses (30.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1389</td>
<td>Internet Programming</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD2380</td>
<td>Artificial Intelligence</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD2421</td>
<td>Machine Learning</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2423</td>
<td>Image Analysis and Computer Vision</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2424</td>
<td>Deep Learning in Data Science</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2434</td>
<td>Machine Learning, Advanced Course</td>
<td>7.5</td>
<td>Second 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>
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</tr>
<tr>
<td>DD2437</td>
<td>Artificial Neural Networks and Deep Architectures</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2440</td>
<td>Advanced Algorithms</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2448</td>
<td>Foundations of Cryptography</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2476</td>
<td>Search Engines and Information Retrieval Systems</td>
<td>9.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DH2323</td>
<td>Computer Graphics and Interaction</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DH2642</td>
<td>Interaction Programming and the Dynamic Web</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DT2112</td>
<td>Speech Technology</td>
<td>7.5</td>
<td>Second 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>DD1388</td>
<td>Program System Construction Using C++</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>DD2350</td>
<td>Algorithms, Data Structures and Complexity</td>
<td>9.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF1630</td>
<td>Discrete Mathematics</td>
<td>9.0</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.

At least two of the conditionally elective courses: DD2423, DD2424, DD2421, DD2434, DD2437, DD2440, DD2448, DD2476, DH2323, DH2642 or DT2112 should be chosen. Following courses are recommended: SF1630 (gives prerequisites), DD2350 and DD1388.

*Students who intend to apply for a Master's degree in Computer Science must select at least three conditionally elective courses at advanced level in Computer Science.*

Students who intend to apply for a Master's degree in Industrial Engineering and Management must select two conditionally elective courses at advanced level in Computer Science.
Year 2

Mandatory courses (22.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH2465</td>
<td>Computer Science, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Recommended courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA2210</td>
<td>Introduction to the Philosophy of Science and Research Methodology for Computer Scientists</td>
</tr>
<tr>
<td></td>
<td><em>The course DA2210 should be chosen instead of ME2002 for students who intend to do a degree project in Computer Science.</em></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

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

Students applying for a Master degree in Computer Science must have a course list approved by CSC school.

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

Students who intend to do a degree project in Industrial Engineering attend the course ME2002.

Track, Sustainable Energy Utilization (EEAA)

Year 1

Mandatory courses (36.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2141</td>
<td>Energy Systems, Models and Scenarios</td>
<td>9.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2407</td>
<td>Sustainable Energy Utilisation</td>
<td>9.0</td>
<td>Second cycle</td>
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</tbody>
</table>
Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG2210</td>
<td>Electricity Market Analysis</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>EG2220</td>
<td>Power Generation, Environment and Markets</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2087</td>
<td>Energy Business</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2411</td>
<td>Renewable Energy Technology</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2437</td>
<td>Modeling of Energy Systems - Energy Utilization</td>
<td>6.0</td>
<td>Second cycle</td>
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</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.

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

Year 2

Mandatory courses (22.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2146</td>
<td>Energy Systems, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
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</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.

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

Track, Financial Mathematics (FMIB)

Year 1

Mandatory courses (40.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
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</thead>
<tbody>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2942</td>
<td>Portfolio Theory and Risk Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2943</td>
<td>Time Series Analysis</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2980</td>
<td>Risk Management</td>
<td>7.5</td>
<td>Second cycle</td>
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</table>
Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF2935</td>
<td>Modern Methods of Statistical Learning</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2955</td>
<td>Computer Intensive Methods in Mathematical Statistics</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2971</td>
<td>Martingales and Stochastic Integrals</td>
<td>7.5</td>
<td>Second 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.

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)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2313</td>
<td>Financial Mathematics, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
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</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF2975</td>
<td>Financial Derivatives</td>
<td>7.5</td>
<td>Second cycle</td>
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</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.

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

Year 1

Mandatory courses (31.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH2408</td>
<td>Evaluation Methods in Human-Computer Interaction</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DT2140</td>
<td>Multimodal Interaction and Interfaces</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
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</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD2423</td>
<td>Image Analysis and Computer Vision</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2424</td>
<td>Deep Learning in Data Science</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DH2321</td>
<td>Information Visualization</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DH2642</td>
<td>Interaction Programming and the Dynamic Web</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DH2670</td>
<td>Haptics, Tactile and Tangible Interaction</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DT2112</td>
<td>Speech Technology</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DT2213</td>
<td>Musical Communication and Music Technology</td>
<td>7.5</td>
<td>Second 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.

At least one of the conditionally elective courses DH2642, DT2112, DH2670, DT2213, DH2321, DD2424 or DD2423 should be chosen.

Those who intend to apply for a degree in MSc in Computer Science, more Conditionally Elective courses has to be chosen.

Year 2

Mandatory courses (22.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH2465</td>
<td>Computer Science, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second 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>DM2572</td>
<td>Theory and Method for Media Technology</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

*Should be chosen only by students who intend to do a degree project in Human-Computer Interaction.*

### 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.**

*The course DM2572 instead of ME2002 should be chosen for students who intend to do a degree project in Human-Computer Interaction.*

### Track, Sustainable Power Generation (HKPA)

#### Year 1

**Mandatory courses (36.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
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<tbody>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2141</td>
<td>Energy Systems, Models and Scenarios</td>
<td>9.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2405</td>
<td>Sustainable Power Generation</td>
<td>9.0</td>
<td>Second cycle</td>
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</tbody>
</table>

**Conditionally elective courses**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
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</thead>
<tbody>
<tr>
<td>EG2210</td>
<td>Electricity Market Analysis</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>EG2220</td>
<td>Power Generation, Environment and Markets</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2087</td>
<td>Energy Business</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2411</td>
<td>Renewable Energy Technology</td>
<td>6.0</td>
<td>Second cycle</td>
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</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

At least one of the conditionally elective courses MJ2437, MJ2411, EG2220, EG2210 or ME2087 should be chosen.
Year 2

Mandatory courses (22.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
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</thead>
<tbody>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2146</td>
<td>Energy Systems, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
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</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

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

Track, Integrated Production Engineering (IPIB)

Year 1

Mandatory courses (30.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MG2028</td>
<td>CAD and Other IT Tools in Industrial Processes</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MG2029</td>
<td>Production Engineering - Planning and Control</td>
<td>6.0</td>
<td>Second cycle</td>
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Conditionally elective courses

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<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MG2020</td>
<td>Modularisation of Products</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MG2040</td>
<td>Assembly Technology</td>
<td>6.0</td>
<td>Second cycle</td>
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</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

One of the conditionally elective courses MG2020 or MG2040 must be chosen.
### Year 2

**Mandatory courses (22.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MG2117</td>
<td>Production, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
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</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.

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

**Track, Mechatronics Product Development (MPUA)**

### Year 1

**Mandatory courses (30.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
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<tr>
<td>MF2030</td>
<td>Mechatronics basic Course</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MF2042</td>
<td>Embedded Systems for Mechatronics, I</td>
<td>6.0</td>
<td>Second cycle</td>
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</tbody>
</table>

**Conditionally elective courses**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
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</thead>
<tbody>
<tr>
<td>MF2007</td>
<td>Dynamics and Motion Control</td>
<td>9.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MF2044</td>
<td>Embedded Systems for Mechatronics, II</td>
<td>6.0</td>
<td>Second cycle</td>
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</table>

* One of the courses MF2007 or MF2044 must be chosen.

**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 MF2007 or MF2044 must be chosen.

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

Mandatory courses (22.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MF2050</td>
<td>Mechatronics, Business and Management</td>
<td>15.0</td>
<td>Second cycle</td>
</tr>
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</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF2079</td>
<td>Mechatronics, Business and Management, extended course</td>
<td>18.0</td>
<td>Second cycle</td>
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</table>

You begin the course year 1, period 4

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.

MF2050 can be replaced by MF2079

Track, Optimization and Systems Theory (OSYT)

Year 1

Mandatory courses (33.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2311</td>
<td>Leadership and Organizational Change</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2312</td>
<td>Advanced Studies in Industrial Economics and Management</td>
<td>12.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2812</td>
<td>Applied Linear Optimization</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2832</td>
<td>Mathematical Systems Theory</td>
<td>7.5</td>
<td>Second cycle</td>
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</tbody>
</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF2822</td>
<td>Applied Nonlinear Optimization</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2842</td>
<td>Geometric Control Theory</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2852</td>
<td>Optimal Control Theory</td>
<td>7.5</td>
<td>Second 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>
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</tr>
<tr>
<td>SF2935</td>
<td>Modern Methods of Statistical Learning</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2942</td>
<td>Portfolio Theory and Risk Management</td>
<td>7.5</td>
<td>Second 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

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

**Year 2**

**Mandatory courses (22.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2002</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2314</td>
<td>Systems Engineering, Business and Management, Part 2</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>SF2868</td>
<td>Systems Engineering, Business and Management, Part 1</td>
<td>7.5</td>
<td>Second cycle</td>
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</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

Degree project, advanced level, 30 credits, is a compulsory course during spring term within Industrial Management or the technical track Optimization and Systems Theory.
Appendix 2: Specialisations

Master's Programme, Industrial Engineering and Management, 120 credits (TIEMM), Programme syllabus for studies starting in autumn 2017

Track, Computer Science (CSCJ)
Track, Sustainable Energy Utilization (EEAA)
Track, Financial Mathematics (FMIB)
Track, Human-Computer Interaction (HCIE)
Track, Sustainable Power Generation (HKPA)
Track, Integrated Production Engineering (IPIB)
Track, Mechatronics Product Development (MPUA)
Track, Optimization and Systems Theory (OSYT)