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 11 (HT - Autumn term; VT - Spring term).

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

Programme objectives

In addition to the aims specified in the Higher Education Ordinance, there are also specific objectives for this Master’s programme. After completing the Master’s programme the student shall…

Knowledge and understanding

- Display advanced skills in mathematics, natural sciences and technology within a chosen track (second cycle)
- Display advances skills in industrial economics and management as well as of the relationship technology-economics-society
- Display expertise of how financial operations and their legal and institutional frameworks can be described, measured, changed and administered and demonstrate knowledge of how different types of established and new technology can support or further develop businesses
- Display expertise of established methods, models and theories within the management area to plan, follow up and lead as well as evaluate the results and quality of different types of industrial and technology-based activities
- Display expertise in management and development on the basis of and with an understanding for different stakeholders – such as: shareholders, customers, employees, society and the environment, and demonstrate insight into possible areas of conflict.
- Display expertise in scientific tools in order to analyse, process and evaluate facts, and demonstrate an awareness of how knowledge can be developed within natural sciences, technology and social sciences

Skills and abilities
Display the ability to independently as well as in groups, be able to transform knowledge and skills into practice with regard taken to relevant scientific professional/profession-related and societal views and standpoints

Display the ability to analyse, formulate and deal with technical problems, from a systems perspective, as well as the ability to set boundaries, decide necessary consumption of resources and to manage processes for problem solving and realisation

Display the ability to assess whether proposed technical systems and activities contribute to the development of a sustainable society.

Display the ability to manage personnel and activities on different organisational levels, within different types of organisational lifecycle stages, within different types of operational logics

Display the ability to sell negotiate and act in an advisory capacity within the chosen technical track/specialisation.

**Ability to make judgements and adopt a standpoint**

- Possess a reflective approach to responsibility and to ethical issues within technical organisational, financial, ecological and societal systems
- Display awareness as to how one’s own personal views and standpoints affect definition and assessments of technical, organisational and financial problems
- Display critical approach to established management methods, models and theories as well as how knowledge is developed within natural sciences, technology and social sciences
- KTH’s local degree ordinance can be found in the KTH regulations, *intra.kth.se/regelverk*

**Extent and content of the programme**

The education comprises 120 higher education credits, which correspond to 2 years of full time study. The education is pursued at advanced level.

The following track currently exist within the Master’s programme:

- Biotechnology and Industrial Engineering
- Energy Systems and Industrial Engineering
- Financial Mathematics and Industrial Engineering
- Integrated Production and Industrial Engineering
- Internetworking and Industrial Engineering
- Mechatronics and Industrial Engineering
- Program Design and Industrial Engineering
- Wireless systems and Industrial Engineering

Teaching is mainly in Swedish, certain courses and some parts of the course are taught in English. From 2012 the language of teaching will be English.

**Eligibility and selection**

Entry requirements to the Master’s programme are a minimum of 150 higher education credits from years 1-3 including completed work towards a Bachelor’s Degree within the Engineering programme Industrial
Engineering and Management at KTH, or a Bachelor’s Degree from an engineering programme in Industrial Engineering and Management with equivalent technology track from another higher education institution. Other studies or work experience are assessed on the basis of the actual competence invoked.

For additional information please refer to KTH’s admission regulations in the KTH regulations, intra.kth.se/reglerverk

**Implementation of the education**

**Structure of the education**

**Structure of the education**

Academic years, terms and study periods are described in the KTH regulations, intra.kth.se.

**Structure of the education**

The structure of the Master program is built on a 30-30-30-30 credit divide. This means that there are 30 credits of compulsory courses within the chosen technical track/specialisation, 30 credits of compulsory courses in industrial economics and management, degree project of/master thesis worth 30 credits, 7.5 credits research methodology and scientific theory and the remaining credits are elective. This allows the students to themselves influence the possibility of taking courses so they can receive a general Master degree within either their chosen technical track/specialisation or industrial economics and management.

**Years 1-2 – Specialised study at advanced level**

Study years 1 and 2 include courses both the subject of industrial economics, as well as one of eight (8) tracks, mainly at advanced level. In addition, integration courses focusing on technology-economics-leadership, and are included in year 1 and 2, master level, are mainly pursued at advanced level.

Apart from previously mentioned professional skills and abilities, knowledge of entrepreneurship is to be integrated in the courses during year 1 and 2, second cycle level/advanced level.

The engineers knowledge of the environment and sustainable development will be deepened and concretised through integration in the programme’s courses with the special aspects of e.g. lifecycle analysis, environmental effects and choice of materials, which are features of the chosen track. Within the track the student should achieve such a depth of understanding that he/she is able carry out a degree project within the subject.

Each student must also choose conditional elective courses at advanced level in the subject Industrial Engineering and Management. The studies in Industrial Engineering and Management should result in a depth of understanding such that the student may accomplish his/her degree project within the subject.

The conditional optional courses within Industrial Engineering and Management at advanced level are within the following areas:

- Industrial Marketing
- Industrial Project Management
• Production Management
• Finance and Control

The courses and study programmes conclude with a degree project, advanced level, consisting of 30 higher education credits. In addition to this you will choose approximately 15 credits worth of elective courses within the program.

Courses

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

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

Term Enrolment and Course Application

A prerequisite to be allowed to participate in the studies is that the student verifies enrollment for courses the coming term every spring and fall. This is done via www.antagning.se between the 1st and 15th of November and the 1st and 15th of May.

By verifying his/her enrolment, the student has submitted his/her intention to continue studying and participating in the programme. After that it is possible for the student to:

• registered for courses
• have results reported
• have the possibility to receive financial support from CSN

Conditions for participation in the programme

For studies in year 2:

At least 45 higher education credits from year 1, advanced level, must be achieved including the re-examination period in August. Students who have not fulfilled this requirement must establish an individual study plan in consultation with the study advisor.

Recognition of previous academic studies

The student has the possibility to apply to receive credits from a course/courses studied at another university within the country or abroad. The person responsible for first-cycle courses and study programmes makes decisions on credit transfers. KTH’s policy for credit transfers can be found in the KTH regulations, intra.kth.se/regulations

Studies abroad
Students of Industrial Engineering and Management have the possibility to study abroad through the agreements KTH has with universities within and outside the EU. It is also possible to do a degree project abroad.

The last date for applications for studying abroad is in the middle of January in the academic year prior to the stay abroad.

**Degree project**

The degree project at advanced level comprises 30 higher education credits. Degree projects can be carried out within chosen track or within the subject Industrial Engineering and Management.

KTH’s rules for degree projects can be found in the KTH regulations, *intra.kth.se*. In general this means that the main part of the studies must have been completed before the degree project can be started.

**Degree**

In order to graduate with the Degree of Master of Science (Two Years) a pass grade must be achieved in all courses, which are included in the student’s study plan. The study plan shall comprise 120 higher education credits including a degree project comprising 30 higher education credits.

KTH’s local degree ordinance can be 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 2011

General courses

Year 2

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>ME2017</td>
<td>Project Management: Leading Project-based Operations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2025</td>
<td>Brand Portfolio Management</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2028</td>
<td>Behavioural Management Control</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2029</td>
<td>Finance</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2030</td>
<td>Finance, Corporate Valuation</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2033</td>
<td>Industrial Dynamics and Technical Change</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2042</td>
<td>Business Negotiations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2053</td>
<td>Logistics &amp; Supply Chain Management</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2054</td>
<td>Purchasing &amp; Supply Chain Management</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2075</td>
<td>Leadership and Power in Industrial Organisations: Perspectives of Gender and Diversity</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2603</td>
<td>Entrepreneurship</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Track, Biotechnology and Industrial Engineering (BIIA)

Year 2

Mandatory courses (25.5 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</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>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2145</td>
<td>Energy Systems - Business - Leadership</td>
<td>12.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2308</td>
<td>Finance - Mathematics - Business Management</td>
<td>12.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MG2017</td>
<td>Production - Business - Leadership</td>
<td>12.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MG2017</td>
<td>Production - Business - Leadership</td>
<td>12.0 hp</td>
<td>Second cycle</td>
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</tbody>
</table>

Track, Energy Systems and Industrial Engineering (ESIA)

Year 2

Mandatory courses (25.5 Credits)

Track, Financial Mathematics and Industrial Engineering (FMIA)

Year 2

Mandatory courses (25.5 Credits)

Track, Integrated Production and Industrial Engineering (IPIA)

Year 2

Mandatory courses (25.5 Credits)

Track, Internetworking and Industrial Engineering (ITIA)

Year 2
Mandatory courses (28.5 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>IK2203</td>
<td>Communication - Business - Leadership</td>
<td>15.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Track, Mechatronics and Industrial Engineering (MEIA)

Year 2

Mandatory courses (28.5 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MF2050</td>
<td>Mechatronics, Business and Management</td>
<td>15.0 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Track, Program Design and Industrial Engineering (PDIA)

Year 2

Mandatory courses (25.5 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH2460</td>
<td>Software Design - Business - Leadership</td>
<td>12.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Track, Wireless Systems and Industrial Engineering (TSIA)

Year 2

Mandatory courses (28.5 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>EQ2435</td>
<td>Wireless Communication-Business-Leadership</td>
<td>15.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2001</td>
<td>Research Methods in Industrial Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2304</td>
<td>Management in Technology Intensive Organisations</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>
Appendix 2: Specialisations

Master's Programme, Industrial Engineering and Management, 120 credits (TIEMM), Programme syllabus for studies starting in autumn 2011

Track, Biotechnology and Industrial Engineering (BIIA)
Track, Energy Systems and Industrial Engineering (ESIA)
Track, Financial Mathematics and Industrial Engineering (FMIA)
Track, Integrated Production and Industrial Engineering (IPIA)
Track, Internetworking and Industrial Engineering (ITIA)
Track, Mechatronics and Industrial Engineering (MEIA)
Track, Program Design and Industrial Engineering (PDIA)
Track, Wireless Systems and Industrial Engineering (TSIA)