



Programme syllabus

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

Degree Programme in Industrial Engineering and Management 300 credits

Civilingenjörsutbildning i industriell ekonomi

Valid for students admitted to the education from autumn 20 (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.

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 2021/2022 offers the following technical specialisations for the Degree Programme in Industrial Engineering and Management *

- Computer Science
- Energy Systems and Sustainable Development
- Product and Production Development
- 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

Each academic year consists of two semesters which are 20 weeks each, and each semester is further divided into two study periods.

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 and conditionally elective 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.

The grading scale is found in the course syllabus

Conditions for participation in the programme

Participation requires admission to courses within the programme and course registration.

For further studies, special admission requirements for the course are to be fulfilled. Special admission requirements are listed in the respective course syllabus.

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.

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.

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

Admission requirements for Master programmes

According to the KTH Admission regulations 2019 (Dnr. V-2018-0961)

"In order to be eligible for second cycle studies within KTH:s Master of Science programmes, 165 credits are required from year 1-3, of which at least 110 credits from year 1 - 2. A degree project, first cycle, must be completed before the studies on the master's program commence. Possible additional special admission requirements exist and appear in the respective programme syllabus."

Degree project

Degree Project, First Cycle

Within the degree programme a degree project, first cycle, which comprises 15 credits, is included. The degree project course can be commenced when the special admission requirements listed in the course syllabus are met.

Degree project, Second Cycle

Within the degree programme a degree project, second cycle, which comprises 30 credits, is included. The degree project course forms the final part of the degree programme. The degree project course can be commenced when the special admission requirements listed in the course syllabus are met.

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 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

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



Appendix 1: Course list

Degree Programme in Industrial Engineering and Management (CINEK)

General courses

Year 1

Mandatory courses (60.5 Credits)

Code	Name	Credits	Edu. level
DD1315	Programming Techniques and Matlab	7.5 hp	First cycle
ME1306	Industrial Project Management	7.5 hp	First cycle
ME1314	Introduction to Industrial Engineering and Management	9.0 hp	First cycle
ME1315	Industrial Marketing for I	6.0 hp	First cycle
SF1624	Algebra and Geometry	7.5 hp	First cycle
SF1625	Calculus in One Variable	7.5 hp	First cycle
SF1626	Calculus in Several Variables	7.5 hp	First cycle
SG1109	Mechanics	8.0 hp	First cycle

Recommended courses

Code	Name	Credits	Edu. level
SF0003	Introductory Course in Mathematics <i>Given in August. Not included in the degree.</i>	1.5 fup	Pre-university level

Year 2

Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
ME1308	Operations Strategy for I	6.0 hp	First cycle
ME1309	Industrial Management Control for I	6.0 hp	First cycle
ME1316	Quantitative Business and Operations Analytics	6.0 hp	First cycle
SF1545	Numerical Methods, Basic Course	6.0 hp	First cycle
SF1633	Differential Equations I	6.0 hp	First cycle
SF1918	Probability Theory and Statistics	6.0 hp	First cycle

Supplementary information

SK1110 Electromagnetism and Waves 7.5 credits is also a mandatory course for CINEK 2. Given in period 3 or 4 depending on choice of specialisation.

During the spring term year 2 you also attend courses within your choice of specialisation.

Year 3

Mandatory courses (18.0 Credits)

Code	Name	Credits	Edu. level
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

Supplementary information

The course list is based upon the curriculum for academic year 2020/2021. 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/

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 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/

Computer Science (DIOI)

Year 2

Mandatory courses (61.5 Credits)

Code	Name	Credits	Edu. level
DD1320	Applied Computer Science	6.0 hp	First cycle
DH1620	Human-Computer Interaction, Introductory Course <i>Replaces DH2620</i>	6.0 hp	First cycle
EP1200	Introduction to Computing Systems Engineering	6.0 hp	First cycle
ME1308	Operations Strategy for I	6.0 hp	First cycle
ME1309	Industrial Management Control for I	6.0 hp	First cycle
ME1316	Quantitative Business and Operations Analytics	6.0 hp	First cycle
SF1545	Numerical Methods, Basic Course	6.0 hp	First cycle
SF1633	Differential Equations I	6.0 hp	First cycle
SF1918	Probability Theory and Statistics <i>Replaces SF1901</i>	6.0 hp	First cycle

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

Year 3

Mandatory courses (54.0 Credits)

Code	Name	Credits	Edu. level
DD1334	Database Technology	6.0 hp	First cycle
DD1385	Software Engineering	6.0 hp	First cycle
DD1389	Internet Programming	6.0 hp	First cycle
DD1396	Parallel and Concurrent Programming in Introduction to Computer Science	3.0 hp	First cycle
DD1418	Language Engineering with Introduction to Machine Learning	6.0 hp	First cycle
DD152X	Degree Project in Computer Science, Communication and Industrial Management, First Level	15.0 hp	First cycle
ME1310	Economics for I	6.0 hp	First cycle
ME1311	Corporate Finance	6.0 hp	First cycle

Supplementary information

The course list is based upon the curriculum for academic year 2021/2022. 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/

The course ME1313 will be replaced by a new course

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 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/

Energy Systems and Sustainable Development (EHUI)

Year 2

Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
ME1308	Operations Strategy for I	6.0 hp	First cycle
ME1309	Industrial Management Control for I	6.0 hp	First cycle
ME1316	Quantitative Business and Operations Analytics	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
SF1918	Probability Theory and Statistics	6.0 hp	First cycle
SK1110	Electromagnetism and Waves	7.5 hp	First cycle

Year 3

Mandatory courses (55.5 Credits)

Code	Name	Credits	Edu. level
EG2205	Power Generation Operation and Planning	7.5 hp	Second cycle
ME1310	Economics for I	6.0 hp	First cycle
ME1311	Corporate Finance	6.0 hp	First cycle
MF1017	Basic Electrical Engineering	6.0 hp	First cycle
MJ1141	Energy Systems and Sustainability	9.0 hp	First cycle
MJ1401	Heat Transfer	6.0 hp	First cycle
MJ148X	Degree Project in Energy Systems, Sustainability and Industrial Engineering, first cycle	15.0 hp	First cycle

Supplementary information

The course list is based upon the curriculum for academic year 2020/2021. 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/

The course ME1313 has expired and will be replaced by a new course.

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/

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/

Product Realisation (PFRI)

Year 2

Supplementary information

The specialisation Product and Production Development (PPUI) replaces the specialisation Product Realisation (PFRI) as from batch autumn 2020.

Year 3

Supplementary information

As from batch -20 specialisation Product and Production Development (PPUI) replaces the specialisation Product Realisation (PFRI).

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 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/

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

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

Product and Production Development (PPUI)

Year 2

Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
ME1308	Operations Strategy for I	6.0 hp	First cycle
ME1309	Industrial Management Control for I	6.0 hp	First cycle
ME1316	Quantitative Business and Operations Analytics	6.0 hp	First cycle
MF1016	Basic Electrical Engineering	9.0 hp	First cycle

MF1039	Design and Product Realization, Components	6.0 hp	First cycle
MG1028	Introductory 3D CAD	1.5 hp	First cycle
SF1545	Numerical Methods, Basic Course	6.0 hp	First cycle
SF1633	Differential Equations I	6.0 hp	First cycle
SF1918	Probability Theory and Statistics	6.0 hp	First cycle
SK1110	Electromagnetism and Waves	7.5 hp	First cycle

Supplementary information

New specialisation: As from batch -20 specialisation Product and Production Development (PPU) replaces the specialisation Product Realisation (PFRI).

Year 3

Mandatory courses (39.0 Credits)

Code	Name	Credits	Edu. level
DD1320	Applied Computer Science	6.0 hp	First cycle
DD1324	Applied Programming and Computer Science, Part 2	3.0 hp	First cycle
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
MG1002	Automation Technology	6.0 hp	First cycle
MG1026	Manufacturing Technology	6.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
MF134X	Degree Project in Product Realization and Industrial Management, First Cycle	15.0 hp	First cycle
MG115X	Degree Project in Product Realization and Industrial Engineering, First Cycle	15.0 hp	First cycle

Supplementary information

The course list is based upon the curriculum for academic year 2021/2022. Changes may occur.

Degree project, first cycle, within technical track Product and Production Development.

Admitted students must choose a degree project directed to production (MG115X) or mechatronics (MF134X).

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

Course ME1313 has expired

Information regarding conditionally elective courses

Admitted students must choose a degree project directed to production (MG115X) or mechatronics (MF134X).

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 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/

Mathematics (TMAI)

Year 2

Mandatory courses (61.5 Credits)

Code	Name	Credits	Edu. level
DD1320	Applied Computer Science	6.0 hp	First cycle
ME1308	Operations Strategy for I	6.0 hp	First cycle
ME1309	Industrial Management Control for I	6.0 hp	First cycle
ME1316	Quantitative Business and Operations Analytics	6.0 hp	First cycle
SF1545	Numerical Methods, Basic Course	6.0 hp	First cycle
SF1632	Complementary Course in Differential Equations and Transforms	3.0 hp	First cycle
SF1633	Differential Equations I	6.0 hp	First cycle
SF1861	Optimization <i>Replaces SF1811</i>	6.0 hp	First cycle
SF1904	Markov Processes, Basic Course	3.0 hp	First cycle
SF1918	Probability Theory and Statistics	6.0 hp	First cycle
SK1110	Electromagnetism and Waves	7.5 hp	First cycle

Supplementary information

As from batch 2020, the course SF1811 is replaced by SF1861 and the course is moved from year 3 to year 2.

The course SF1632 is a new course within the specialisation as from batch-20.

Year 3

Mandatory courses (55.5 Credits)

Code	Name	Credits	Edu. level
DD1418	Language Engineering with Introduction to Machine Learning	6.0 hp	First cycle

ME1310	Economics for I	6.0 hp	First cycle
ME1311	Corporate Finance	6.0 hp	First cycle
SF100X	Degree Project in Applied Mathematics and Industrial Economics, First Cycle	15.0 hp	First cycle
SF2863	Systems Engineering	7.5 hp	Second cycle
SF2930	Regression Analysis	7.5 hp	Second cycle
SF2940	Probability Theory	7.5 hp	Second cycle

Supplementary information

The course list is based upon the curriculum for academic year 2021/2022. 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/

The course ME1313 has expired and will be replaced by a new course.

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 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/

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

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



Appendix 2: Specialisations

Degree Programme in Industrial Engineering
and Management (CINEK)

Computer Science (DTOI)

No information entered.

Energy Systems and Sustainable Development
(EHUI)

No information entered.

Product Realisation (PFRI)

No information entered.

Product and Production Development (PPUI)

No information entered.

Mathematics (TMAI)

No information entered.