Programme syllabus

Degree Programme in Mechanical Engineering
Högskoleingenjörsvägning i maskinteknik, Södertälje
180.0 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 aims that are specified in the higher education ordinance, an engineer who has been graduated from Mechanical Engineering, KTH, should

Knowledge and understanding
- be able to apply basic technical knowledge within fields such as materials engineering, solid mechanics, manufacturing process, electrical and control engineering, as well as computer-based engineering tools such as CAD
- demonstrate basic knowledge in mathematics and natural science and the ability to critically and systematically use knowledge to model, simulate and evaluate processes on the basis of relevant information

Skills and abilities
- demonstrate the knowledge and skills necessary to work independently as an engineer within the disciplinary domain
- demonstrate the ability to independently and creatively identify, formulate and solve problems within mechanical engineering areas with regard to existing possibilities and constraints
- demonstrate the ability to manipulate and shape sustainable products, processes and systems based on technical, ethical, economic and societal aspects
- demonstrate skills and understanding of the importance of teamwork and collaboration in multidisciplinary and multicultural project teams
- be able to participate in the utilisation and implementation of new technology, where it entails designing products, processes and work environment

Ability to make judgements and adopt a standpoint
- demonstrate knowledge of how the design of products and systems can best be adapted to human wants and needs with respect to environmental aspects
- have an awareness of how technology affects society with regard to human conditions and needs
- be conscious of society's goals regarding resource management, economy and environment
- have acquired the ability to immerse themselves in new technology areas and have a good basis for continuing personal development and lifelong learning, both within their own and other new subject areas, in order to be able to follow the increasingly rapid technological developments and the changes they entails
Extent and content of the programme

The programme comprises 180 higher education credits, which corresponds to three years of full-time studies. The programme level is primarily first cycle. The language of instruction is mainly Swedish. Some courses and course components may be taught in English, and certain course literature is in English.

The programme is the same for all specialisations during the first three semesters. Choice of specialisation is made pursuant to the KTH instructions.

Specializations:
- Industrial Engineering and Production
- Innovation and Design
- Robotics and Mechatronics
- Security and Management of Advanced Systems

Eligibility and selection

To study at KTH, the general entry requirements for higher education apply. In addition, the following specific entry requirements must be fulfilled for admission to KTH's engineering programmes: Field-specific entry requirement A8 (Physics 2, Chemistry 1, Mathematics 3c). Other studies or professional experience are assessed based on the prior knowledge required.

Otherwise refer to the KTH admission regulations in the KTH regulatory framework, www.kth.se

Implementation of the education

Structure of the education

Programme arrangement

Academic years, semesters and study periods are found in the KTH regulatory framework, www.kth.se

If necessary, instruction may be provided outside the parameters of the academic year. Refer to the composition of academic years in the KTH regulatory framework, www.kth.se

Structure of the programme

The academic year is divided into 4 study periods and normally several courses are read in parallel. Teaching and examination forms vary from course to course. Normally part of the course consists of lectures which introduce students to concepts and theories. Exercises and laboratory work reinforce the understanding of the theoretical relationships. Engaging in project work according to an industry model plays a vital role in the programme. This provides group training in addressing reality-based tasks in an engineering way.

The programme consists of compulsory courses for the first two years, including a specialization preparatory bundle of courses. To create a unified whole, the programme emphasises cooperation between courses, both in a specific year and between years. Three specialisations are offered within the programme; Industrial Engineering and Production, Innovation and Design, and Robotics and Mechatronics and Security and Management of Advanced systems.

The programme is concluded in the final semester with a degree project, which is often carried out with an employer outside the school.

Year 1
An introductory course provides the student with perspectives on engineering and the engineer's role as well as the basics of project methodology, group dynamics and presentation techniques. Basic courses in mathematics, engineering materials, manufacturing process, programming, mechanics, and CAD represent the core basic courses pertaining to the first year.

Year 2

During the second year, all specialisations involve courses within the applied subjects relating to engineering science and technology. The specialisations begin during the year. The different specialisations are described in more detail in appendix 2. During the year a specialization preparatory bundle of courses is chosen.

Year 3

During the third year, specialisation-specific courses are given, including 15 credits optional courses.

The programme concludes with a degree project.

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

Course application and semester registration

For the autumn semester, semester registration takes place in conjunction with enrolment. Course registration is done by the student via personal login at www.kth.se

A prerequisite for participating in the studies is that, each autumn and spring, the student applies for courses prior to the coming semester. Course application is done via www.antagning.se between 1 and 15 November, and 1 and 15 May, respectively.

If the student does not apply via www.antagning.se, the application is only considered subject to availability.

In addition, the student must complete their semester and course registration in conjunction with each course start via personal login at www.kth.se

Choice of specialisation is made prior to semester 4 in accordance with KTH instructions.

For studies in 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. Students who do not fulfil this requirements must establish an individual study plan together with the study advisor.

For studies in year 3:

At least 90 credits from years 1 and 2 should be completed by the end of the examination period in August, according to the course list of the programme syllabus. Students who do not fulfil this requirements must establish an individual study plan together with the study advisor.

For degree projects, see the separate heading.
Individual study plan
A student who is lagging behind in their studies and does not meet the above requirements must, in consultation with the study advisor for the programme, establish an individual study plan for the continuing studies. An individual study plan may mean that the student cannot be guaranteed full-time studies. See the KTH regulatory framework: www.kth.se

Recognition of previous academic studies
Students on the Mechanical Engineering Programme have the opportunity to apply to be given credit for results from a course or courses at another higher education institution/university within or outside the country. As the grading systems differ widely between countries, grades from exchange studies are not translated to the KTH grading scale. The entire KTH policy for credit transfer is included in the KTH regulatory framework, www.kth.se

Studies abroad
Students on the Mechanical Engineering Programme have the opportunity to study abroad through agreements KTH has with universities within and outside the EU. Exchange studies normally cannot be pursued during the first or second year. It is also possible to do the degree project abroad.

For the application deadline, see www.kth.se

Degree project
Year 3 of the programme includes a degree project which is a course of 15 credits.

Regarding the degree project:

- It may not be commenced until 120 credits have been obtained and when a final grade has been received in relevant courses which concern the content of the degree project
- It may be commenced after the examiner has approved the assignment
- It is based on the knowledge obtained during the study period and is usually carried out in semester 6
- It shall constitute proof of an independent piece of work comprising theoretical and/or experimental activity with an accompanying written report and oral presentation
- Supervisors are appointed by the examiner

KTH's rules for degree projects are found in the KTH regulatory framework, www.kth.se

Degree
The student must personally apply for a certificate. Applications are made by logging on to www.kth.se where “Applications for degrees” is found under the heading “Programme”.

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 180 credits that form the basis for the degree.

To obtain a Bachelor of Science in Engineering, Degree Programme in Mechanical Engineering, requires a passing grade in all courses included in the student's study plan. The study plan consists of the compulsory courses, the elective courses that the student has followed and the degree project. The study plan must include at least 180 credits.

Application for a certificate is done according to KTH instructions, see www.kth.se

KTH's local Degree Ordinance is found in the KTH regulatory framework, www.kth.se
Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions
## Appendix 1: Course list

Degree Programme in Mechanical Engineering (TIMAS), Programme syllabus for studies starting in autumn 2017

### General courses

#### Year 1

**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>ML1000</td>
<td>Engineering Mathematics</td>
<td>11.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1101</td>
<td>Mechanics, General Course</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1110</td>
<td>Mechanical Engineering, Introduction Course</td>
<td>9.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1111</td>
<td>Business Control with Applied Statistics</td>
<td>9.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1200</td>
<td>Engineering Materials and Production, General Course</td>
<td>10.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1209</td>
<td>Computer Based Product Development Tools, Basic Course</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1309</td>
<td>Programming and Numerical Tools</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

### Supplementary information

Course list: Information is based upon the curriculum for academic year 2017/2018. Changes may occur.

#### Year 2

**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>HM1006</td>
<td>Electrical and Control Engineering</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1201</td>
<td>Strength of Materials, General Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1203</td>
<td>Energy Technology</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1206</td>
<td>Machine Components</td>
<td>10.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

### Supplementary information

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

**Industrielle Engineering och Produktions (SIEP)**

**Year 1**

**Year 2**

**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>HM1016</td>
<td>Manufacturing Process, Intermediate Course 1</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1030</td>
<td>Industrial Economics and Organisation</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1108</td>
<td>Decision Models and Impact Assessment</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1906</td>
<td>Factory Design - Shop Layout, Production Flow and Work Environment</td>
<td>7.5</td>
<td>First cycle</td>
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</table>

**Year 3**

**Mandatory courses (7.5 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>ML100X</td>
<td>Degree Project in Mechanical Engineering, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML101X</td>
<td>Degree Project in Industrial Business Administration and Manufacturing, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
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</table>

**Conditionally elective courses**

<table>
<thead>
<tr>
<th>Course code</th>
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<th>Credits</th>
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</tr>
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<tbody>
<tr>
<td>ML100X</td>
<td>Degree Project in Mechanical Engineering, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML101X</td>
<td>Degree Project in Industrial Business Administration and Manufacturing, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

**Supplementary information**

Changes may occur.
### Year 4

#### Innovation and Design (SIOD)

#### Year 1

#### Year 2

**Mandatory courses (30.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
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<th>Credits</th>
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</tr>
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<tbody>
<tr>
<td>ML1030</td>
<td>Industrial Economics and Organisation</td>
<td>7.5</td>
<td>First cycle</td>
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<tr>
<td>ML1108</td>
<td>Decision Models and Impact Assessment</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1213</td>
<td>Product Development and Design</td>
<td>15.0</td>
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#### Year 3

**Conditionally elective courses**

<table>
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<th>Edu. level</th>
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</thead>
<tbody>
<tr>
<td>ML100X</td>
<td>Degree Project in Mechanical Engineering, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML102X</td>
<td>Degree Project in Innovation and Design, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
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</table>

**Supplementary information**

Changes may occur.

#### Year 4

#### Robotics and Mechatronics (SROB)

#### Year 1

#### Year 2

**Mandatory courses (45.0 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
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<th>Edu. level</th>
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<tbody>
<tr>
<td>HM1016</td>
<td>Manufacturing Process, Intermediate Course 1</td>
<td>7.5</td>
<td>First cycle</td>
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<tr>
<td>ML1030</td>
<td>Industrial Economics and Organisation</td>
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<td>First cycle</td>
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<td>Decision Models and Impact Assessment</td>
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<td>Product Development and Design</td>
<td>15.0</td>
<td>First cycle</td>
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<td>ML1906</td>
<td>Factory Design - Shop Layout, Production Flow and Work Environment</td>
<td>7.5</td>
<td>First cycle</td>
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Year 3

Conditionally elective courses

<table>
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<tr>
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<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML100X</td>
<td>Degree Project in Mechanical Engineering, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML103X</td>
<td>Degree Project in Mechatronics and Robotics, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
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</table>

Supplementary information
Changes may occur.

Year 4

Security and Management of Advanced Systems (SSLA)

Year 1

Year 2

Mandatory courses (45.0 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>HM1016</td>
<td>Manufacturing Process, Intermediate Course 1</td>
<td>7.5</td>
<td>First cycle</td>
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<tr>
<td>ML1030</td>
<td>Industrial Economics and Organisation</td>
<td>7.5</td>
<td>First cycle</td>
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<tr>
<td>ML1108</td>
<td>Decision Models and Impact Assessment</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1213</td>
<td>Product Development and Design</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ML1906</td>
<td>Factory Design - Shop Layout, Production Flow and Work Environment</td>
<td>7.5</td>
<td>First cycle</td>
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Year 3

Mandatory courses (7.5 credits)

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<th>Credits</th>
<th>Edu. level</th>
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<tr>
<td>AH2401</td>
<td>Risk in Technical Systems</td>
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Conditionally elective courses

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<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML100X</td>
<td>Degree Project in Mechanical Engineering, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>
Supplementary information
Changes may occur.

Year 4
Appendix 2: Specialisations

Degree Programme in Mechanical Engineering (TIMAS), Programme syllabus for studies starting in autumn 2017

- **Industrial Engineering and Production (SIEP)**
- **Innovation and Design (SIOD)**
- **Robotics and Mechatronics (SROB)**
- **Security and Management of Advanced Systems (SSLA)**