Programme syllabus

Master's Programme, Sustainable Technology, 120 credits
Masterprogram, teknik och hållbar utveckling

120.0 credits

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

The information is valid for students starting 2020-2021. There could be changes in year 2 – please check www.kth.se for information about the latest study plan.

Beyond the objectives that are specified in the Higher Education Degree Ordinance, there are also specific goals for this programme. A graduate from the programme must:

Knowledge and understanding

- have an understanding of society’s effects on the world’s ecosystems, of today’s global societal challenges, of alternative forms of management of natural resources and on transitions towards a sustainable development

- have a broad scientific knowledge and understanding of the main notions of Industrial Ecology

- be able to address complex issues from a multidisciplinary perspective and in a comprehensive systems-thinking manner, e.g. with life cycle thinking

- have theoretical understanding of the methods, strategies and tools of Industrial Ecology

- have deep knowledge within a specific area of Industrial Ecology.

Skills and abilities

- be able to analyse and formulate the role of technology in sustainable development

- be able to use the strategies, tools and methods within Industrial Ecology and apply principles and processes of natural ecosystems to develop strategies for more sustainable industrial systems
• be able to identify the interrelationships between and within techno, economic, ecological and social systems, and to quantify the associated material and energy flows, as well as their implications to natural systems

• be able to identify or develop strategies and methods for improved socio-technical system solutions leading to increased resource efficiency and improved material cycles and minimized environmental impacts of product systems

• be able to apply new and existing research to understand the environmental and resource implications of industrial systems

• be able to critically analyse, formulate and handle quantitative and qualitative data/information related to complex societal challenges

• be able to independently, as well as in a group, apply knowledge and abilities in a practical context, with regards to relevant scientific and professional aspects

• be able to, in a competent way, critically interpret and communicate, orally and in writing, one’s own work to different stakeholders

### Ability to make judgements and adopt a standpoint

• have a good understanding that the engineering problems in areas of sustainable development and Industrial Ecology are often complex and can contain social, economic and environmental trade-offs

• be aware of personal responsibility and the ethical standpoints associated with working with sustainable development

• reflect on what is a scientific approach in various controversial environmental issues (e.g. climate change) and have an understanding of how science is used in decision making

KTH’s local degree ordinance can be found in KTH’s guidelines, www.kth.se

### Extent and content of the programme

The programme consists of 120 credits, which correspond to two-years of full-time study.

The programme is primarily on the second level. The programme consists of compulsory, conditionally elective and elective courses.

The language of instruction in the programme is English.

### Eligibility and selection

#### Basic requirements
In order to be eligible for the Master’s programme, a relevant higher education degree, technical Bachelor degree, or other corresponding technical, natural or other science degree relevant for the programme in the first cycle, comprising 180 higher education credits is required.

Students in their final year of undergraduate studies may apply and, if qualified, receive a conditional acceptance. These applicants must include a written statement from their current university.

Other studies or work experiences are assessed based on the competence referred to.

**Special requirements**

No special requirements

**Selection into the programme**

The selection process is based on an evaluation of the following criteria: University/college, grades, relevant courses to the programme, English skills, basic mathematical knowledge, proposals for thesis, personal letters, work experience and references. The evaluation scale is 1-75.

For further information see KTH:s admission regulations in the KTH regulatory framework, www.kth.se

**Implementation of the education**

**Structure of the education**

The study year comprises 40 weeks and is divided into two terms, autumn and spring term. Each term comprises two study periods. Study years, terms, and study periods are described in KTH’s guidelines, www.kth.se

**Structure of the education**

The programme’s first three terms consist of theoretical courses, some of which are compulsory for all students. The studies are, to a large extent, project-based work and case studies which means that a large focus will be on training, communication, critical thinking, and oral and written presentations. Several courses in the later part of the programme are linked to practical knowledge through collaboration with different companies and authorities. The programme concludes with a degree project in the fourth term.

**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.

Information regarding the grading scale found in the course curriculum.
Conditions for participation in the programme

Participation requires admission to courses within the programme and course registration. Course registration is done via the personal menu at www.kth.se

For students starting their education from the autumn semester 2018, previous promotion requirements have been replaced with special admission requirements to each course. Admission requirements are specified in the course syllabus.

Recognition of previous academic studies

Students are able to apply to receive credits for the results of course/courses completed at another college/university within the country or abroad.

For more information please refer to KTH's regulations in www.kth.se and programme's student guidance counselling.

Studies abroad

Students are able to apply to receive credits for the results of course/courses completed at another college/university within the country or abroad.

For more information please refer to KTH's regulations in www.kth.se and programme's student guidance counselling.

Degree project

The degree project is the final part of the education. The project work may begin when special admission requirements for the course are fulfilled.

The degree project is a course comprising 30 credits, equivalent to 20 weeks of full-time study. The thesis work should not include other courses (with own course codes).

Information regarding the grading scale on the degree project can be found in the syllabus.

KTH’s rules regarding the degree project for the Master’s degree can be found in the KTH Guidelines: Degree projects

Degree

In order to earn the award of the Degree of Master of Science (Two Years), passing grades in all courses, which are included in the student’s study plan, are required. The study plan must comprise 120 higher education credits which include:

- at least 60 ECTS credit at advanced level including mandatory and conditionally elective courses
- 30 credit degree project within the master programme
- a maximum of 30 ECTS credit of entirely elective courses preferably on advanced level
For mapped civil engineering programs (CENMI, CMAST), the following applies: In case of the Master's program serves as a conclusion to an engineering degree, the degree requirements according to the education plan in the respective engineering degree programs are added.

**Application for Degree**

The application for degree certificate is done through the personal menu at www.KTH.se

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

Master's Programme, Sustainable Technology, 120 credits (TSUTM), Programme syllabus for studies starting in autumn 2020

General courses

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>AL2181</td>
<td>Environmental System Analysis and Decision making</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2615</td>
<td>Introduction to Industrial Ecology, larger course</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2659</td>
<td>Technology and Ecosystems, Larger Course</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2673</td>
<td>Research Methodology and Theory of Science</td>
<td>7.5 hp</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>AL2115</td>
<td>Transdisciplinary Approaches for System Innovations</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2130</td>
<td>Waste Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2134</td>
<td>Environmental Modelling</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2143</td>
<td>Cleaner Production and Industrial Environmental Technology Exchange for AL2140</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2156</td>
<td>Applied Ecology</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2160</td>
<td>Environmental Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2190</td>
<td>Ecological Economics</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Information regarding conditionally elective courses

At least three of the conditionally elective courses must be chosen in year 1.

At least five of the conditionally elective courses must be chosen in year 1 and 2, whereof one of the courses AL2608, AL2142 or AL2161, have to be included for a degree.
for CENMI, one (1) of the conditionally elective courses AL2134, AL2115, AL2608 must be read.

For mapped civil engineering programs (CENMI, CMAST), the following applies: In case of the Master's program serves as a conclusion to an engineering degree, the degree requirements according to the education plan in the respective engineering degree programs are added.

**Year 2**

**Mandatory courses (30.0 Credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL227X</td>
<td>Degree Project in Industrial Ecology, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
</tbody>
</table>

**Conditionally elective courses**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL2110</td>
<td>Sustainable Food Production and Consumption</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>AL2142</td>
<td>Material and Energy Flow Accounting for Cleaner Production</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>AL2161</td>
<td>Environmental Management II, Advanced Course</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>AL2195</td>
<td>Sustainable Development in Developing Countries</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>AL2608</td>
<td>Life Cycle Assessment</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>Exchange AG2800</td>
<td></td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>MJ2685</td>
<td>Smart Cities and Climate Mitigation Strategies- Project Based</td>
<td>7.5 hp Second cycle</td>
</tr>
</tbody>
</table>

**Information regarding conditionally elective courses**

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At least five of the conditionally elective courses must be chosen in year 1 and 2, whereof one of the courses AL2608, AL2142 or AL2161, have to be included for a degree.

for CENMI, one (1) of the conditionally elective courses AL2134, AL2115, AL2608 must be read.

For mapped civil engineering programs (CENMI, CMAST), the following applies: In case of the Master's program serves as a conclusion to an engineering degree, the degree requirements according to the education plan in the respective engineering degree programs are added.
Appendix 2: Specialisations

Master's Programme, Sustainable Technology, 120 credits (TSUTM), Programme syllabus for studies starting in autumn 2020

This programme has no specialisations.