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 17 (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 2017-2018. There could be changes in year 2 – please check www.kth.se for information about the latest study plan.

Beyond the objectives which 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 and of today’s global societal challenges, and knowledge 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 systems-thinking way, 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-year 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.

Applicants, who at the time of application have no degree certificate of at least 180 credits, may be granted conditional admission. Conditional admission granted if the above requirements of the degree are expected to be fulfilled by the time of registration. A Certificate from university/college, proving that the student is enrolled in a study program which if completed will lead to the degree must accompany the notification.

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

Special requirements

No special requirements

Selection into the programme

Selection to the program is based on an evaluation of the following criteria: University/college, grades, relevant courses to the program, proposals for thesis, personal letters, work experience and references.

Otherwise refer to KTH’s admission regulations in the KTH regulations.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. The courses 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

Semester registration and Course registration

A prerequisite for students' participation in studies at KTH is that the student performs a course registration and semester registration for each semester.

Registration is done under the personal menu on the KTH:s webb page

Course registration is done by all students on the program www.antagning.se

For studies in study year 2:

At least 45 higher education credits must be completed from study year 1 by the end of the examination period in August. Students who have not fulfilled this requirement must, in collaboration with a study adviser, create an individual study plan. The main intent with the individual study plan is that the student will complete the remaining elements during the next coming study year. In the study plan, the remaining elements should be included as well as suitable courses from the next study year. Special consideration should be given to the courses’ prerequisites.

Recognition of previous academic studies

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

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

Studies abroad

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

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

Degree project

The degree project is a course compromising 30 credits meaning it should cover 20 weeks full time studies. The thesis work should not include other courses (with own course codes).

Generally, a larger portion of the studies must be completed before the degree project can be started. At least 60 credits should be completed where of 30 credits on advanced level inside the main area of study.
Information regarding the grading scale on the degree project refer to 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 90 ECTS at advanced level including mandatory and conditionally elective courses and a 30 credit degree project within the master programme.

In addition is allowed:

- a maximum of 30 ECTS of entirely elective courses

When the Master’s programme is the final part of the degree programme in engineering, additional degree requirements according to the study programme for the engineering programme should be fulfilled.

Students who have already used the 7.5 elective credits in years 1-3 may only read 22.5 credits elective courses within their master studies in order to also achieve the degree requirements for the degree.

**Application for Degree**

The application for degree is done under the personal

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 2017

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</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2615</td>
<td>Introduction to Industrial Ecology, larger course</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2659</td>
<td>Technology and Ecosystems, Larger Course</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2673</td>
<td>Research Methodology and Theory of Science</td>
<td>7.5</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</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2130</td>
<td>Waste Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2134</td>
<td>Environmental Modelling</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2140</td>
<td>Cleaner Production</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2156</td>
<td>Applied Ecology</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2160</td>
<td>Environmental Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2190</td>
<td>Ecological Economics</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Supplementary information

When the Master’s programme is the final part of the degree programme in engineering, additional degree requirements according to the study programme for the engineering programme should be fulfilled.

Students who have already used the 7.5 elective credits in years 1-3 may only read 22.5 credits elective courses within their master studies in order to also achieve the degree requirements for the degree.
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>AL227X</td>
<td>Degree Project in Industrial Ecology, Second Cycle</td>
<td>30.0</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>AG2800</td>
<td>Life Cycle Assessment</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2110</td>
<td>Sustainable Food Production and Consumption</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2142</td>
<td>Material and Energy Flow Accounting for Cleaner Production</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2161</td>
<td>Environmental Management II, Advanced Course</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AL2195</td>
<td>Sustainable Development in Developing Countries</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>MJ2685</td>
<td>Smart Cities and Climate Mitigation Strategies- Project Based</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Supplementary information

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Year 3
Appendix 2: Specialisations

Master's Programme, Sustainable Technology, 120 credits (TSUTM), Programme syllabus for studies starting in autumn 2017

This programme has no specialisations.