



Programme syllabus

Master's Programme, Environmental Engineering, 120 credits

Masterprogram, miljöteknik

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 who started the program academic year 2017-2018. Later decisions may affect year 2 in the program. Please look at KTH's website for further information.

In addition to the general objectives for Masters programmes as stated in the national degree ordinance and the local degree policy of KTH, specific learning outcomes are defined for the study track Environmental Management in the Nordic Masters programme Environmental Engineering. After completing the programme requirements students shall:

Knowledge and understanding

- Demonstrate knowledge on the theoretical concepts and foundations in environmental engineering and management.
- Demonstrate in-depth knowledge on how human interventions and natural changes affect the environmental conditions in land and water resources, and what resulting effects these can cause.
- Demonstrate specialised knowledge on the tools and methods that can be applied to analyse the status of land and water resources.
- Demonstrate a sound understanding of the relation between theory and practice in environmental engineering, as well as of the linkages to other disciplines involved in environmental engineering at the local, regional and global level.

Skills and abilities

- Demonstrate the ability to carry out qualified research tasks on contemporary problems, and in this way contribute to scientific progress in the field of study

- Demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work.
- Be able to make effective oral and written presentations of complex tasks related to environmental engineering/management using modern techniques and tools to illustrate and visualise results.
- Be able to lead and work in multidisciplinary groups and contribute to the outcome of the working task.

Ability to make judgements and adopt a standpoint

- Be able to detect normative assumptions in theoretical and societal views on sustainability.
- Demonstrate the ability to critically reflect on alternative scientific approaches for different environmental problems
- Demonstrate the ability to critically reflect on the causes of, as well as potential solutions for, new upcoming environmental problems
- Demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

Extent and content of the programme

The Masters programme Environmental Engineering counts 120 credits and consists of three terms of coursework and one term for the degree project, together 2 years. The course-work encompasses theoretical courses, exercises, projects and laboratories that aim at providing students knowledge and skills in the field of environmental engineering. All courses in the programme are at advanced (2nd cycle) level. The language of instruction is English.

The Nordic Master program Environmental Engineering (www.enviro5tech.org) is a joint two-year Master's program that is offered by Aalto University, Chalmers University of Technology (CTH), Technical University of Denmark (DTU), Royal Institute of Technology (KTH) and the Norwegian University of Science and Technology (NTNU). The program covers five tracks among which KTH offers the Environmental Management track together with DTU.

Environmental management is an essential part of Environmental Engineering which refers to the interaction between human society and our surroundings. To meet the challenges for a sustainable management of natural resources, there is a need for multi-skilled professionals who are able to combine in-depth knowledge of local and global environmental impacts with expertise on strategies and tools that aim at reducing this impact on nature and environment. This requires among others aptitudes, knowledge of models and methods for collecting and analyzing environmental information; knowledge on the interdependencies between society and environmental problems, and knowledge of the tools necessary for changing human behavior for greater sustainability. To prepare students for their professional career, the study track offers a sequence of technical courses and management courses as well as a number of courses on the interplay between the economic, social and environmental determinants that contribute to sustainable development.

Eligibility and selection

The general admission requirement for the Nordic masters' programme in Environmental Engineering is a completed Bachelor's degree in Civil or Environmental Engineering, corresponding to a Swedish Bachelor's degree (180 credits), or equivalent academic qualifications from an internationally recognised university. Students in their final year of their undergraduate education may also apply and if qualified, receive a conditional acceptance. The applicant's qualifications must include a strong working knowledge of mathematics, physics and chemistry and applicants must document that they have fulfilled the following minimum requirements:

- Mathematics: 20 credits
- Physics: 10 credits
- Chemistry: 5 credits

For English language proficiency following requirements are defined:

TOEFL: Paper-based: 580 (written section grade 4,5) or Internet-based test: 92 (written section grade 22)

IELTS: 6.5, no section lower than 5.5 (only IELTS Academic Training accepted).

For alternative ways to meet the English language requirements check KTH's website.

Students with a B.Eng degree (Diplomingeniør (DK), Polytechnic (FI), Högskoleingenjör (SE) or equivalent, must have completed courses within the areas of operations research or discrete mathematics (5 credits) and algorithms and stochastic processes (5 credits).

For candidates fulfilling the above requirements, the ranking and selection of students is carried out by KTH and DTU on basis of the student's academic achievements and motivation letter. The evaluation scale is 1-75.

Implementation of the education

Structure of the education

Since the program results in a double degree, student should complete at least 60 credits of coursework at KTH and DTU respectively. Students who apply to the Master's programme in Environmental Engineering at KTH will start their first year of studies (60 credits) in the track Environmental Management at KTH and continue at DTU to complete their second year of studies (60 credits), including a 30 credits degree project. Another option is to start at DTU to complete the first year (60 credits) and continue the second year of studies at KTH (60 credits), including a 30-credit degree project. For this option students should apply to DTU.

Application to the program, regardless of where the first year is started sends to DTU.

Independent of whether students start at KTH or DTU, the Environmental Management track consists of a combination of technical and management courses, together with courses that highlight environmental

challenges in a societal context. In the first year, KTH offers courses in Environmental Impact Assessment and Strategic Environmental Assessment which are worldwide established frameworks for environmental management. In addition, a course in Environmental Chemistry and Risk Assessment is offered that provides knowledge on pollutants behavior in natural environments and remediation technologies, which prepares students for the course in Water and Wastewater Engineering. Moreover the track includes a sequence of courses in environmental management and information consisting of Environmental Data, Natural Resources Management and Environmental Measuring and Monitoring. In the courses Sustainable Urban and Rural Development or Environmental Aspects of the Built Environment environmental problems are analysed from a planning perspective that provides a basis for the courses Urban Infrastructure and/or Governance of Land and Water Resources which focuses on alternative strategies for a sustainable management of natural resources.

The second year at DTU offers courses on principles and tools for environmental management in different settings and socio-economic perspectives on environmental problems. The third semester also allocates 10 credits for electives. The fourth semester is devoted to the degree project.

For students who start at DTU, the first year consists of courses on tools for environmental systems analysis and environmental management. In addition, a course on chemical eco-toxicology is offered as well as two courses on the interaction between society and environment. The first year also allows students to select electives corresponding 10 credits. The third semester at KTH includes a number of courses which students can choose among: Environmental Impact Assessment, Environmental Data or Engineering Geology. The semester comprises two mandatory courses Project Environmental Engineering, in which students apply their collected knowledge in a practical project, and Water Treatment Processes and Technology. In the last semester students have to carry out a Degree Project.

A course in Theory of Science and Research Methodology (7,5 credits) is mandatory for all master programs at KTH and for students who have not completed an equivalent course in their previous studies, the course Theory and Methods of Science is mandatory as part of their studies at KTH.

The academic year covers 40 weeks, starting in September and divided into two terms, which each consists of two study periods. Each study period concludes with a regular examination period of at least one week.

Courses

The programme is course-based. Lists of courses are included in [appendix 1](#).

During the first year at KTH, the program includes a set of courses which allows students to acquire specialised professional skills. In period 2, 3 and 4 students can choose among different courses.

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 scale found in the curriculum.

Conditions for participation in the programme

Semester/Course registration

A prerequisite for a student's 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 web page

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

For registration in term 3 students should have completed at least 45hp. For registration for the degree project students should have completed at least 60 hp of the compulsory courses.

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

The Nordic master program Environmental Engineering involves one year of mandatory studies at one of the partner universities. For students in the track Environmental Management this implies that students have to complete one year of studies (60 ECTS) at DTU. The programme offers no opportunities for studies at a third university.

Degree project

The degree project comprises 30 credits and provides students with the opportunity to investigate a problem in depth under the supervision of experienced practitioners and researchers.

Students who start their studies in the Environmental Management track will conduct the Degree project at DTU with a supervisor from DTU and a co-supervisor from KTH. Students who start their studies at DTU will conduct their degree project at KTH with a supervisor at KTH and a co-supervisor at DTU. The supervision from each of the two degree awarding institutions involved in the study ensures the integration of the program components.

Information regarding the grading scale on the degree project refer to the syllabus.

Degree

To obtain the master's degree from KTH, students must have passed courses of at least 120 higher education credits, of which the following must be included:

- at least 60 higher education credits from courses at KTH and at least 60 higher education credits from courses at DTU

- at least 90 ECTS at advanced level including mandatory and conditionally elective courses and a 30-credit degree project within the master programme

Students who have fulfilled the above mentioned degree requirements of the Masters programme will be awarded a double degree from DTU and KTH:

KTH: Teknologic masterexamen, translated into English as Degree of Master of Science (120 credits)

DTU: Master of Science in Engineering

[Appendix 1 - Course list](#)

[Appendix 2 - Programme syllabus descriptions](#)



Appendix 1: Course list

Master's Programme, Environmental Engineering, 120 credits (TEEGM), Programme syllabus for studies starting in autumn 2017

General courses

Year 1

Mandatory courses (7.5 Credits)

Course code	Course name	Credits	Edu. level
MJ2673	Research Methodology and Theory of Science	7.5 hp	Second cycle

Conditionally elective courses

Course code	Course name	Credits	Edu. level
AE2104	Environmental Measuring and Monitoring	7.5 hp	Second cycle
AE2304	Water and Wastewater Handling	7.5 hp	Second cycle
AE2501	Environmental Impact Assessment	7.5 hp	Second cycle
AE2503	Environmental Data	7.5 hp	Second cycle
AE2507	Strategic Environmental Assessment	7.5 hp	Second cycle
AE2707	Governance of Land and Water	7.5 hp	Second cycle
AE2801	Environmental Chemistry and Risk Assessment	7.5 hp	Second cycle
AG2141	Urban Infrastructure	7.5 hp	Second cycle
AG2143	Sustainable Rural and Urban Development	7.5 hp	Second cycle
AG2803	Ecosystem Support and Environmental Justice	7.5 hp	Second cycle
AL2300	Natural Resources Management Tools	7.5 hp	Second cycle

Supplementary information

Students who apply to the masters programme in Environmental Engineering at KTH will start their first year of studies (60 ECTS) in the track Environmental Management at KTH and continue at DTU to complete their second year of studies (60 ECTS), including a 30 ECTS degree project as follows;

For students who start at DTU, the first year of studies includes following courses:

Recommended course

12104 Modelling of Environmental Processes and Technologies (10 ECTS)

<http://www.kurser.dtu.dk/12104.aspx?menulanguage=en-gb>

12237 Chemicals in the Environment (10 ECTS)

<http://www.kurser.dtu.dk/12237.aspx?menulanguage=en-gb>

42273 Urban Planning and Sustainable Urban Development (10 ECTS)

<http://www.kurser.dtu.dk/42273.aspx?menulanguage=en-gb>

Optional courses

12240 Environmental Management and Ethics (5 ECTS),

<http://www.kurser.dtu.dk/12240.aspx?menulanguage=en-gb>

42631 Environment and Economics (5 ECTS)

<http://www.kurser.dtu.dk/42631.aspx?menulanguage=en-gb>

42372 Life Cycle Assessment of Products and Systems (10 ECTS)

<http://www.kurser.dtu.dk/42372.aspx?menulanguage=en-gb>

Year 2

Mandatory courses (7.5 Credits)

Course code	Course name	Credits	Edu. level
MJ2673	Research Methodology and Theory of Science	7.5 hp	Second cycle

Conditionally elective courses

Course code	Course name	Credits	Edu. level
AE2107	Modelling of Water Systems	7.5 hp	Second cycle
AE2302	Water Treatment Processes and Technology	7.5 hp	Second cycle
AE2401	Engineering Geology	7.5 hp	Second cycle
AE2501	Environmental Impact Assessment	7.5 hp	Second cycle
AE2503	Environmental Data	7.5 hp	Second cycle
AL231X	Degree Project in Environmental Engineering, Second Cycle	30.0 hp	Second cycle

Supplementary information

Students who apply to the masters programme in Environmental Engineering at KTH will start their first year of studies (60 ECTS) in the track Environmental Management at KTH and continue at DTU to complete their second year of studies (60 ECTS), including a 30 ECTS degree project.

Link to courses at DTU

Semester 3 at DTU:

12240 Environmental Management and Ethics 5 ECTS (Recommended) <http://www.kurser.dtu.dk/12240.aspx?menulanguage=en-gb>

42631 Environment and Economics 5 ECTS (Recommended) <http://www.kurser.dtu.dk/42631.aspx?menulanguage=en-gb>

42372 Life Cycle Assessment of Products and Systems 10 ECTS (Optional) <http://www.kurser.dtu.dk/42372.aspx?menulanguage=en-gb>

Semester 4 at DTU:

Degree Project 30 ECTS

For students who start at DTU, the second year of studies includes following courses, see academic plans.



Appendix 2: Specialisations

Master's Programme, Environmental Engineering, 120 credits
(TEEGM), Programme syllabus for studies starting in autumn 2017

This programme has no specialisations.