Programme syllabus

Master's Programme, Technology, Work and Health, 120 credits
Masterprogram, teknik, arbete och hälsa
120.0 credits

Valid for students admitted to the education from autumn 19 (HT - Autumn term; VT - Spring term).

This is a translation of the Swedish, legally binding, programme syllabus.

Programme objectives

The programme aims to provide a deeper understanding of the interplay between humans, technology and organisation, from the perspectives of sustainable work and organisational performance. The programme will give the student knowledge and proficiency in proactive occupational safety and health (OSH) management, as well as in how to analyse Plan and design work environments.

The graduates will further possess advanced theoretical and applied knowledge in the field of physical, cognitive and organisational ergonomics, applicable for work with development of organisations and processes, with focus on improvements of work and ergonomic interventions for a sustainable working life.

After graduation, the student will be able to actively influence and manage change and development projects within the field of technical work environments. The student will have knowledge if risk assessment methods, safety strategies and project management within production and product development. The programme is a suitable foundation for research studies within technology, work and health.

Knowledge and understanding

Graduates from the programme, shall have knowledge and understanding of:

- How to pursue a consultative and proactive OSH management work.
- How work, work activities and organisations can be analysed and designed to promote safe and sustainable work practices, as well as individual health and wellbeing.
- How effective OSH management work can influence an organisation’s quality, productivity and financial performance.
- How projects, interventions and change processes can be managed from ergonomic and system perspectives. How physical work environments can be analysed and evaluated, and improved through technical and organisational measures.
- The roles of the social partners, as well as the legislative framework relevant for OSH management and the work environment.
- Professional demands for competence and independence, in relation to both the own organisation and potential customers’. This includes being able to refer matters to other specialists and professions.

Skills and abilities

Skills and abilities

Graduates from the programme shall on individual basis, have acquired skills and abilities to independently be able to:

- Work from a systems perspective on humans, technology and organisations.
• Actively manage, or commission, measures for an improved technical work environment.

• Plan and manage ergonomics projects and interventions regarding the interplay between humans, technology and work organisation.

• Perform work environment investigations, including analyses and evaluations of measurements, with the purpose of assessing risk and improve the technical and organisational work environment.

• Communicate the results, both orally and in writing, in dialogue with different stakeholders, to clearly account for and discuss their conclusions and the arguments on which these are based.

**Ability to make judgements and adopt a standpoint**

Graduates from the programme shall demonstrate the ability to:

- Participate in the creation towards sustainable work environments, through a systems perspective on the OSH management work, with respect to professional, ethical, social and economic aspects.
- Acquire a professional and inter-disciplinary approach, based on science and good praxis within the area.

**Extent and content of the programme**

The programme comprises 120 credits, which corresponds to two years of full-time studies. The programme is in the second cycle and the language of instruction is mostly English. All mandatory courses in the programme is second cycle and taught in English, but some elective courses can be first cycle and taken at another university and in a different language.

The first year of the programme consists of mandatory courses (three) and conditionally elective courses. Within the programme the student has opportunities to specialise within:

- Work Environment Engineering (WEE)
- Human Factors and Ergonomics (HFE)

The sum of mandatory and conditionally elective courses must amount to a minimum of 75 credits. All graduates are required to do a master thesis of 30 credits (by way of exception, a student can elect to do master thesis of 15 credits for a master one year-exam). The remaining credits are elective but must be relevant for the programme objectives.

**Eligibility and selection**

The general admission requirement for masters’ programmes at KTH is a completed Bachelor's degree in technical, natural or medical sciences. In addition, the exam must contain, or be supplemented with 15 credits in mathematics or statistics.

The selection process is based on the following selection criteria: university of Bachelor studies, grades in specific subjects, and a personal letter of motivation.

**Implementation of the education**

**Structure of the education**

The broad scope of Technology and Health is distinctly interdisciplinary, where knowledge and practices from several scientific disciplines meet. The education in this programme is systems oriented with focus on the sociotechnical systems and the interplay between human, technology and organisation (HTO). The progression in the programme is done through the continued specialisation:

- Work Environment Engineering, WEE
- Human Factors and Ergonomics, HFE
Work Environment Engineering (WEE) include elaborations in the theory and practice of technical and physical work environments, as well as organisation and management of occupational safety and health work (OSH).

This specialisation will provide a successive deepening of knowledge in OSH management with focus on the technical work environment, from the organisation of work, via change management and risk assessments, to the effects of the work environment on an organisations operational and financial performance.

Correspondingly, the ergonomic design of products and artefacts can be optimised from and performance influencing factors. This specialisation is planned in accordance to the governmental requirements regarding advanced education and training in work environment engineering. After completion of the studies, the graduate will have suitable knowledge, understanding and proficiency to work as a Work Environment Engineer.

Human Factors and Ergonomics (HFE) is based on the International Ergonomics Associations (IEA) definition of ergonomics as a scientific discipline concerned with the understanding of interactions among humans, technology and organisations of a system, and the profession that applies theory, principles, data and methodsto design to optimize human well-being and overall system performance. The discipline is design oriented and mainly concerned with planning and designing of workplaces, tasks, products and systems.

After completion of the studies, the graduate will have suitable knowledge, understanding and proficiency to work as a Human Factors Specialist or Ergonomist.

The education is based on so called blended learning with teaching in most of the courses on campus during four to five days, every three weeks. In between the campus meetings, the graduate will study independently or in groups with course projects and e-learning activities. In some courses that are given in cooperation with other programmes at KTH, the teaching can however be more regular.

Through course projects and the master thesis, the graduate will train their ability to integrate the acquired knowledge and abilities from the different topics in the programme.

During the first year, the graduate elects specialization in Work Environment Engineering, or Human Factors and Ergonomics. Year one can if a student wishes be finished with a 15 credit thesis, which facilitates a one-year master exam. The second year elaborates deeper into the topics of OSH management, product development, Human factors and ergonomics, as well as the planning and design of work environments.

Courses

The programme is course based. List of courses are included in Appendix 1.

During the first year, the following courses of 7.5 credits are mandatory:

- Occupational Safety and Health Management and Change
- Theory and Methodology of Science with Applications
- System Safety and Risk Management

In addition, the following courses are conditionally elective, within the two specialisations:

for Work Environment Engineering:

- Evaluation and Measures of the Acoustic Work Environment and Vibrations, 4.5 credits
- Evaluation of Physiological and Biomechanical Workload, 3 credits
- Evaluation and Measures of the Physical and Chemical Work Environment, 15 credits

for Human Factors and Ergonomics:
· Prevention of Musculoskeletal Disorders, 7.5 credits
· Cognitive Ergonomics, 7.5 credits

During the second year, the following course of 7.5 credits is mandatory:
· Work Environment Economics

During the second year, the following courses of 7.5 credits are elective:
· Ergonomics in Product Development
· Planning and Design of Physical Work Environments
· Ergonomics, Human Factors and Patient Safety

During the second half of year two, the graduates do a degree project that comprises 30 credits. The degree project can be done individually or in groups of two students.

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
At the beginning of a course the student must submit a compulsory course registration via the personal menu at www.kth.se.

Some of the elective courses may have limited admission. Selection of applicants is done based first on completed credits, and second on results on previous courses.

For students starting their education from the autumn semester 2019, 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 can apply for credit transfer of results from a course or courses at another higher education institution/university, within or outside the country. The entire KTH policy for credit transfer is included in the KTH regulatory framework at www.kth.se.

Studies abroad
Courses and the degree project can be done outside of Sweden after approval from the examiner and under the condition that the programme objectives are fulfilled. The application deadline for studies abroad is around 15 December for the following academic year.

Degree project
The programme includes a degree project for a Degree of Master that comprises 30 credits and is usually carried out in the spring semester of year 2. Commencement of the degree project requires that at least 60 credits have been obtained, of which 30 credits relate to specialised studies in the second cycle within the Master's Programme. KTH's comprehensive rules and guidelines for a degree project, 30 credits, for a Degree of Master, 120 credits, can be found in the KTH regulatory framework at www.kth.se. The Degree project may begin when special admission requirements for the course are fulfilled. The grade is Pass or Fail.
Degree

The degree of Master of Science in Technology and health is obtained after completion of courses comprises of 120 credits, including a degree project of 30 credits.

The application for degree is done by the graduate online at www.kth.se

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

Master's Programme, Technology, Work and Health, 120 credits (TTAHM), Programme syllabus for studies starting in autumn 2019

General courses

Year 1

Mandatory courses (22.5 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>HN2015</td>
<td>Occupational Safety and Health Management and Change</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2021</td>
<td>Theory and Methodology of Science with Applications (Ergonomics)</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2022</td>
<td>System Safety and Risk Management</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>HN2016</td>
<td>Evaluation and Measures of the Physiological and Acoustic Work Environment *Compulsory for track WEE*</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2017</td>
<td>Evaluation and Measures of the Physical and Chemical Work Environment *Compulsory for track WEE*</td>
<td>15.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2018</td>
<td>Ergonomics for the Prevention of Musculoskeletal Disorders *Compulsory for track HFE*</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2019</td>
<td>Cognitive Ergonomics *Compulsory for track HFE*</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2020</td>
<td>Work Environment Economics *Compulsory for track HFE*</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN205X</td>
<td>Degree Project in Technology, Work and Health</td>
<td>15.0</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Supplementary information

The programme has two tracks:

Work Environment Engineering (WEE)

Human Factors and Ergonomics (HFE)
Year 2

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>HN2023</td>
<td>Ergonomics in Product Development</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2024</td>
<td>Planning and Design of Physical Work Environments</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>HN2025</td>
<td>Ergonomics, Human Factors and Patient Safety</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Supplementary information

At least two of the following courses must be taken: HN2023, HN2024 and HN2025.
Appendix 2: Specialisations

Master's Programme, Technology, Work and Health, 120 credits (TTAHM), Programme syllabus for studies starting in autumn 2019

This programme has no specialisations.