



Programme syllabus

[An accessible version of the syllabus can be found in the Course and programme directory.](#)

Master's Programme, Sustainable Energy Engineering 120 credits

Masterprogram, hållbar energiteknik

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

In addition to the objectives specified in the Swedish Higher Education Ordinance, there are also specific objectives for this programme. Graduates from the programme shall...

Knowledge and understanding

- have a broad scientific foundation that enables them to work within the fields of energy engineering. This applies to knowledge on sustainable systems in terms of energy sources and use, as well as the assessment of technical, economic and environmental implications related to different energy conversion processes.

- demonstrate broad knowledge within this technical field, including knowledge in mathematics and natural science, and substantial specialised knowledge within certain parts of the field.

Skills and abilities

- demonstrate a good ability to, independently and in a group, apply knowledge and skills in practice while taking into account relevant scientific, professional/profession-related and societal assessments and standpoints
- demonstrate a good ability to analyse, formulate and manage technical problems from a systems perspective, with a holistic view of their life cycle, from concept/requirements to specification, development, operation and decommissioning, and an ability to set boundaries, determine the necessary resource consumption and manage processes for problem-solving/realisation
- possess individual and professional skills, such as in the area of language, leadership, project management and communication, to work as an engineer in a management position or as a leader within a technology-intensive company, or to be able to continue towards a research career.

Ability to make judgements and adopt a standpoint

- have a particularly good understanding of the fact that engineering problems are often complex, can be incompletely defined and sometimes involve conflicting conditions
- be aware of the responsibilities and ethical standpoints that may arise in connection with various technical, organisational, economic, ecological and societal activities

Extent and content of the programme

The programme comprises 120 credits, which corresponds to 2 years of full-time studies. The programme is in the second cycle and the language of instruction is English.

Elective specialisation areas (profiles) for the programme are within Sustainable Energy Utilisation, Power Generation, Solar Energy and Transformation of Energy Systems/Policy and Management.

Eligibility and selection

Eligibility for the Master's Programme requires a relevant university education of at least 180 credits, a Bachelor of Science in Engineering or a technical Degree of Bachelor within the subject area of mechanical engineering or chemical engineering. Another similar technical or scientific first-cycle education may also qualify the applicant. Courses in engineering thermodynamics, heat transfer and fluid mechanics for engineers are included in the admission requirements. English skills equivalent to English, course B/ 6.

These skills may be assessed as NOT complete if:

- the University from where the degree has been issued is deemed, by local authorities, not to be of acceptable quality and standard.

- the degree is not acceptable for master level studies in the country where it has been issued.

The selection process is based on the following criteria: university, credits awarded (e.g. grades, grades in specific subjects and English), motivation for the studies (for instance, letter of motivation, references, courses and relevant professional experience providing such proof is not mandatory though). The assessment of qualifications scale is 1-75.

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

Implementation of the education

Structure of the education

Academic year

Each academic year consists of two semesters which are 20 weeks each. Each semester is divided into two study periods.

Structure of the programme

The programme begins with a common course package during semester 1 which provides a solid base for the profiles provided during semester two and three. The third semester includes advanced studies within the field of energy with a research preparatory perspective. The programme concludes with a degree project during semester 4.

Courses

The programme is course-based. Lists of courses are included in appendix 1.

The programme is structured in the form of courses. Course lists are found in appendix 1. The programme consists of compulsory, conditionally elective, recommended and optional courses.

The compulsory courses are defined for each year and profile in course lists. The goals, entrance qualifications, content and course requirements for each course can be found in the official course syllabuses.

The forms of instruction and examination vary between the courses and these are indicated in each official course syllabus.

The optional courses can be chosen from KTH's range of offered courses. Credits from courses at other universities/higher education institutions can also be transferred if the qualification requirements are met.

The following limitations apply to optional courses:

- There is a limit imposed on the number of credits that may be chosen per semester
- An optional course may not correspond to a significant extent to an existing programme course or an already credited course
- Higher education preparatory courses may not be counted as optional courses
- Optional courses may be chosen freely but should be relevant to the professional role of engineer.

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.

Grading scale is found in the course syllabus.

Conditions for participation in the programme

Participation requires admission to courses within the programme and course registration.

For studies at a higher study year there are *specific admission requirements for the courses. Admission requirements are specified in the course syllabus.*

Selection of profile

Selection of profile is done by registration for courses prior to semester 2.

Degree project

Degree project, second cycle

The programme includes a degree project for a Degree of Master that comprises 30 credits.

In order to fulfill specific admission requirements for a Degree Project, Second Cycle, 30 credits, courses corresponding to at least 60 credits, second cycle, must be completed. The courses at the second cycle shall include courses in the programme relevant to the degree project, as well as courses in science theory and research methodology.

Degree

Conditions for a Degree of Master, 120 credits

A Degree of Master of Science is obtained after completing the degree programme. The programme is designed so that the student, when they graduate, has fulfilled the national qualification

requirements with a passing grade in all courses included in the student's study plan of 120 credits, of which

- at least 90 credits are attained in the second cycle, which includes at least 60 credits (including a 30 credit degree project) of specialised studies within the programme's main field of study.

Title of general qualification at second cycle

Degree of Master of Science (120 credits) Teknologie masterexamen

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



Appendix 1: Course list

Master's Programme, Sustainable Energy Engineering (TSUEM)

General courses

Year 1

Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
MJ2405	Sustainable Power Generation	9.0 hp	Second cycle
MJ2407	Sustainable Energy Utilisation	9.0 hp	Second cycle
MJ2410	Energy Management	6.0 hp	Second cycle
MJ2411	Renewable Energy Technology	6.0 hp	Second cycle
MJ2413	Energy and Environment	6.0 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
ME2085	Transformation in Energy Systems and Industries <i>Profile: "Transformation of Energy Systems: Policy and Management"</i>	6.0 hp	Second cycle
ME2087	Energy Business <i>Profile: "Transformation of Energy Systems: Policy and Management"</i>	6.0 hp	Second cycle
MJ2381	Introduction to Energy Systems Analysis and Applications - Minor Course <i>Profile: "Transformation of Energy Systems: Policy and Management"</i>	6.0 hp	Second cycle
MJ2412	Renewable Energy Technology, Advanced Course <i>Profile "Sustainable Power Generation"</i>	6.0 hp	Second cycle
MJ2422	Thermal Comfort and Indoor Climate <i>Profile: "Sustainable Energy Utilization"</i>	6.0 hp	Second cycle
MJ2423	Applied Refrigeration and Heat Pump Technology <i>Profile: "Sustainable Energy Utilization"</i>	6.0 hp	Second cycle
MJ2424	Computational Methods in Energy Technology <i>Profile: "Sustainable Energy Utilization", "Sustainable Power Generation", "Solar Energy"</i>	6.0 hp	Second cycle
MJ2426	Applied Heat and Power Technology <i>Profile "Sustainable Power Generation"</i>	6.0 hp	Second cycle
MJ2476	Strategies in the Global Climate Agenda <i>Profile: "Transformation of Energy Systems: Policy and Management"</i>	6.0 hp	Second cycle
MJ2500	Large Scale Solar Power <i>Profile: "Solar Energy"</i>	6.0 hp	Second cycle
MJ2501	Solar Energy Systems for Buildings and Cities <i>Profile: "Solar Energy"</i>	6.0 hp	Second cycle

Recommended courses

Code	Name	Credits	Edu. level
ED2200	Energy and Fusion Research	6.0 hp	Second cycle
MJ2244	Airbreathing Propulsion, Intermediate Course I	6.0 hp	Second cycle
MJ2246	Rocket Propulsion	6.0 hp	Second cycle
MJ2430	Thermal Turbomachinery	6.0 hp	Second cycle
MJ2437	Modeling of Energy Systems - Energy Utilization	6.0 hp	Second cycle
MJ2438	Modeling of Energy Systems - Heat and Power Generation	6.0 hp	Second cycle
MJ2472	Energy Planning and Applications	9.0 hp	Second cycle

Supplementary information

One profile must be chosen during year 1:

Sustainable Energy Utilization

(mandatory courses: MJ2422, MJ2423, MJ2424)

Sustainable Power Generation

(mandatory courses: MJ2412, MJ2424, MJ2426)

Solar Energy

(mandatory courses: MJ2500, MJ2501, MJ2424)

Transformation of Energy Systems: Policy and Management

(mandatory courses: ME2087, ME2085, MJ2476, MJ2381)

Year 2

Mandatory courses (18.0 Credits)

Code	Name	Credits	Edu. level
MJ2409	Applied Energy Technology, Project Course	9.0 hp	Second cycle
MJ2440	Measurement Techniques	3.0 hp	Second cycle
MJ2475	Theory and Methodology of Science for Energy Research	6.0 hp	Second cycle

Recommended courses

Code	Name	Credits	Edu. level
EG2340	Wind Power Systems	7.5 hp	Second cycle
ME2086	Global Energy Markets and Systems in Transition	6.0 hp	Second cycle
MJ2383	Energy System Economics, Modelling and Indicators for Sustainable Energy Development	6.0 hp	Second cycle
MJ2429	Turbomachinery	6.0 hp	Second cycle
MJ2434	Advanced Refrigeration and Heat Pump Technology	6.0 hp	Second cycle
MJ2460	Green Building - Concept, Design, Construction and Operation	6.0 hp	Second cycle
MJ2462	Achieving Energy Efficiency in Existing Buildings	6.0 hp	Second cycle
MJ2477	Energy Policy and Planning	6.0 hp	Second cycle
MJ2503	Small Scale Polygeneration	6.0 hp	Second cycle
MJ2505	Practical Optimization of Energy Networks	6.0 hp	Second cycle

Supplementary information

Recommended courses, but not mandatory:

Sustainable Energy Utilization

(Recommended courses: MJ2434, MJ2460, MJ2462)

Sustainable Power Generation

(Recommended courses: MJ2420, MJ2429, MJ2505)

Solar Energy

(Recommended courses: MJ2503, MJ2505, MJ2460, EG2340)

Transformation of Energy Systems: Policy and Management

(Recommended courses: MJ2477, ME2086, MJ2383)

Mandatory: Master thesis project, 30 cr.



Appendix 2: Specialisations

Master's Programme, Sustainable Energy Engineering (TSUEM)

This programme has no specialisations.