



## HÖGSKOLAN I GÄVLE

### Master Programme in Energy Systems 60 cr

*Magisterprogram i Energisystem 60 hp*

Set by -

#### Version

Set at	Valid from
12/3/14	ST15
5/30/22	HT23

<b>Education level</b>	Second cycle
<b>Programme code</b>	TAENS
<b>Credits</b>	60 cr
<b>Diary number</b>	HIG-UTB 2014/18

#### Target

A Degree of Master (60 credits) is awarded after the student has completed the courses required to gain 60 credits with a defined specialisation determined by each higher education institution itself, of which at least 30 credits are for specialised study in the principal field (main field of study) of the study programme. In addition the prior award of a Degree of Bachelor, a Degree of Bachelor of Fine Arts, a professional or vocational qualification of at least 180 credits or a corresponding qualification from abroad is required.

#### Knowledge and understanding

For a Degree of Master (60 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both an overview of the field and specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

#### Skills and abilities

For a Degree of Master (60 credits) the student shall

- demonstrate the ability to integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information,
- demonstrate the ability to identify and formulate issues autonomously as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames,
- demonstrate the ability in speech and writing to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or employment in some other qualified capacity.

<b>Judgement and attitudes</b>	<p>For a Degree of Master (60 credits) the student shall</p> <ul style="list-style-type: none"> <li>- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work,</li> <li>- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and</li> <li>- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.</li> </ul>
<b>Content and structure</b>	<p>The main field of Energy Systems</p> <p>Energy systems are typically divided into three types depending on the level and application: industrial energy systems, building energy systems, and regional/global energy systems. In the program, mainly these three types and their application are studied. Appropriate background is a first cycle degree in the relevant subject area, for example energy engineering, construction engineering, mechanical engineering, or equivalent. The program prepares for work in the production/conversion, distribution, and use of energy, and gives understanding of working with energy primarily on a system level. The program as a whole has a focus on the creation of sustainable energy systems for minimising the use of resources (i.e., labour, capital, raw materials, energy, and the environment). The labour market for a Master's Degree in Energy Systems is found, for example, at energy companies, process industries, as well as in the consulting and contracting industry. Tasks, as might be expected, consist, for instance, of research and development, project management, and efficiency measures in the energy engineering sector.</p> <p>Main structure</p> <p>The introductory courses in the program give a fundamental understanding of the concept of energy system, energy resources, and renewable energy. Also the conversion of energy from a thermodynamic and energy system perspective is studied in the early stages. After the foundation has been laid, sustainable urban environments are studied from an energy perspective as well as the energy use in buildings and industries. Optimisation and simulation of the energy systems that have been dealt with in earlier courses are covered in a special course in the latter part of the program. Optimisation is performed with the aim of minimising the use of resources but still meet the requirements set by the user on the energy supply. A short course in scientific writing trains and prepares students for the final thesis work. The program is entirely given in English.</p>
<b>Other degree</b>	<p>A requirement for the award of a Degree of Master (60 credits) is completion by the student of an independent project (degree project) for at least 15 credits in the main field of study.</p>
<b>Degree title</b>	<p>Master of Science (60 Credits)</p>
<b>Prerequisites</b>	<p>A completed Bachelor's degree, corresponding to a Swedish Bachelor's degree (180 ECTS), or equivalent academic qualifications from an internationally recognised university.</p> <p>The degree must be within the area of energy, mechanics, building or another adequate subject area. Also required is a minimum of 12 ects in Thermodynamics and Fluid mechanics.</p> <p>English language proficiency equivalent to (the Swedish upper secondary school) English course B/6.</p>
<b>Other</b>	<p>Credit transfer of courses passed is done in consultation with the Programme Director and the Subject Supervisor concerned.</p> <p>Transition stipulations</p> <p>A student admitted to the programme in a previous year follows the curriculum that was in force at that time.</p> <p>For a student admitted to a later part of the programme or a student having had an interruption of studies, a special curriculum is drawn up by the Programme Director in consultation with the student and, when need arises, the Study Counsellor or the Director of Studies.</p>

**Year 1**

<b>Period</b>	<b>Identifier</b>	<b>Title</b>	<b>Level</b>	<b>Credits</b>	<b>Field</b>
1:1	ETA013	<i>Building Energy Systems</i>	A1N	7.5 cr	Energy Systems
1:1	ETA009	<i>Energy Systems</i>	A1N	7.5 cr	Energy Systems
1:2	ETA011	<i>Energy Management</i>	A1N	7.5 cr	Energy Systems
1:2	ETA010	<i>Renewable Energy Resources</i>	A1N	7.5 cr	Energy Systems
1:3	ETA328	<i>Scientific Methods and Writing in Energy Engineering</i>	A1F	3 cr	Energy Technology
1:3	ETA327	<i>Industrial Energy Systems</i>	A1F	6 cr	Energy Systems
1:3	ETA326	<i>Energy Systems Optimisation and Simulation</i>	A1F	6 cr	Energy Technology
1:4	ETA701	<i>Degree Project for a Master of Science (One Year) with a major in Energy Systems</i>	A1E	15 cr	Energy Systems