1 Aim and outcomes

1.1 Aim
The international oriented master's programme aims to develop the knowledge, skills and competence in the field of energy-efficient and environmental buildings for cold climates.

1.2 Outcomes for a Degree of Master of Science (120 credits)
(Higher Education Ordinance 1993:100)

Knowledge and understanding
For a Degree of Master of Science (120 credits) the student shall:
- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of 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.

Competence and skills
For a Degree of Master of Science (120 credits) the student shall:
- demonstrate the ability to critically 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;
- demonstrate the ability in speech and writing both nationally and internationally 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 autonomous employment in some other qualified capacity.

Judgement and approach
For a Degree of Master of Science (120 credits) the student shall:
- 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;
- 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
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

1.3 Specific outcomes for a Degree of Master of Science (120 credits)
The ultimate goal is that students who have completed the programme will be capable with their advanced professional competence to significantly contribute and influence the design and building or renovation to achieve energy-efficient buildings, taking into consideration the architecture, the environment, the inhabitants’ behavior and needs, their health and comfort as well as the overall economy. The building sector is in need of professionals that are competent within all these aspects, with a “whole building” perspective.

The programme aims to meet the needs of qualified professionals that are competent within all these aspects, with a “whole building” perspective.

use of energy systems in the planning of new buildings and renovation of existing buildings;
- apply all key aspects into a whole building perspective in relation to theory and practice, to achieve sustainable and high performance buildings;
- contribute to the process of reducing the environmental impact of buildings using their professional qualifications and design capabilities;
- profit by and contribute to research in this field.

The programme profits from the earlier as well as ongoing research at the Faculty of Engineering and by the proximity of collaboration with the building industry.

Knowledge and understanding
For a Degree of Master of Science (120 credits) students shall:
- demonstrate knowledge and qualified understanding about the role and importance of building design in the long term and sustainable development of society, including a broad knowledge of technical systems, energy systems, components, material properties, design methods, analysis and assessment tools as well as knowledge about international research trends and challenges related to the development of affordable energy-efficient buildings;
- demonstrate a qualified and methodical knowledge related to the planning process and building construction process.

Competence and skills
For a Degree of Master of Science (120 credits) students shall:
- demonstrate the capacity to critically and systematically integrate his/ her knowledge about energy-efficient buildings and sustainable development as well as analyze and assess complex systems and design processes;
- demonstrate the capacity to critically, autonomously and creatively identify and formulate relevant questions, to plan and, with adequate methods, carry out qualified design projects within specific time frames;
- demonstrate his/ her capacity to understand the building as a whole with its integrated systems and with this holistic view in mind, be able to design sustainable, affordable and energy-efficient buildings that are moisture safe with high levels of indoor comfort and with efficient use of energy systems, and to present and discuss his/ her propositions and conclusions to different professional groups or types of audiences,
The programme includes nine (9) courses and one (1) degree project, all compulsory. The first two dimensions listed above refer to courses having 7.5 credits while the third dimension represents how the theoretical knowledge is practiced and related to a whole building design and process, in courses with 15 credits. The purpose of the larger and applied courses is to give a deeper understanding of the different subjects and their interactions, and to understand the importance of each parameter in relation to the whole building and the inhabitants. Each of the three first semesters consists of two theme specific courses (7.5 credits each) and one applied course (15 credits). The first semester starts with an overview of the importance of reducing the energy use in buildings and to increase the fraction of renewable energy supply. This will relate to the different EU directives and other agreements that give the framework in which we all need to work in. The last semester consists of the degree project (30 credits) in which the student shall demonstrate sufficient knowledge achieved for independent work in the field of energy-efficient and environmental buildings.

2.1 Courses
The courses included in the programme are detailed in the curriculum and schedule.

2.2 Levels
The courses on the programme are divided into levels. The level is indicated in the relevant course syllabus. The relevant levels are first cycle (G) and second cycle (A). These levels are defined in the Higher Education Act, Chapter 1 Section 8-9. First-cycle courses at the Faculty of Engineering are further subdivided into First cycle 1 (G1) and First cycle 2 (G2). G2 courses presuppose knowledge acquired on G1 courses. Second-cycle courses may constitute specializations in a Master's degree.

2.3 Grades
Grades are awarded both for entire courses and for course components, when applicable. Course components are indicated in the relevant syllabus. Grades for an entire course are awarded according to a scale of four grades (Fail, 3, 4, 5) or a scale of two grades (Fail, Pass). If another scale of grades is applied, this is indicated in the course syllabus. Only entire passed courses (according to the four-grade scale) are included on the degree certificate. Grades awarded in Swedish higher education are criterion-referenced, i.e., the performances of students are assessed with reference to the relevant learning outcomes and no internal ranking of students is made.

3 Specific admission requirements

3.1 Admission requirements
To be eligible for the Master programme applicants are required to have the equivalent of a Swedish degree in Engineering, Bachelor of Science in Architectural Engineering or Bachelor of Science in Architecture of no less than 180 credits. The applicant must have fulfilled courses within the three subjects building technology/structural engineering, building physics/science and building services. A minimum of 3 credits is required for each of these three subjects. In addition, a total of 30 credits is required as sum of any combination of courses within energy and building technology/structural engineering, building physics/science, building services, building materials and architecture.

3.2 Selection
Applicants are selected based on the excellence of their grades. In addition to the grades, the content of the degree and courses determines the applicants’ eligibility to the programme.

4 Degree

4.1 Degree requirements
For a Degree of Master of Science (120 credits) students must complete courses comprising 120 credits, including a degree project worth 30 credits. 75 credits must be second-cycle credits, including the degree project.
4.1.1 Degree project
For a Degree of Master of Science (120 credits) the student must complete an independent project (degree project) of no less than 30 credits as part of the course requirements. The degree project must be completed in accordance with the valid course syllabus and must deal with a relevant subject. The student may commence work on the degree project when at least 75 credits of courses can be included in the degree.

4.2 Degree and degree certificate
When students have completed the degree requirements, they are entitled to apply for a degree of a Master of Science (120 credits). Main field of study: Energy-efficient and Environmental Buildings.