LUND UNIVERSITY

LTH
FACULTY OF ENGINEERING

Programme Syllabus

Master's Programme in Energy-efficient and Environmental Building Design

- Faculty: Faculty of Engineering, LTH
- Programme code: TAEMB
- Credits: 120
- Admission level: Bachelor's degree
- Degree level: Second cycle
- Approved by: Programme Board V
- Approval date: 28 January 2026
- Validity: Academic year 2026/2027
- Entry into force: 28 January 2026

1 Aim and outcomes

1.1 Aim

The international oriented master's programme aims to develop knowledge, skills and competence in the field of energy-efficient and environmental buildings in heating dominated climates. This includes the design and building or renovation to achieve energy-efficient buildings and relating to renewable energy supply, taking into consideration the architecture, the environment, the inhabitants' behaviour 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.

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 systematically 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 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 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 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,

- 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) in Energy-efficient and Environmental Buildings

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 and relating to renewable energy supply.

The programme aims to meet the needs of qualified professionals who can

- integrate energy-efficiency, moisture safety, indoor comfort and health, environmental aspects and economy with efficient use of energy systems in the planning of new buildings and renovation of existing buildings, and relating to renewable energy supply,
- 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, and
- 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, and
- 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 analyse and assess complex systems and design processes, using supportive computer tools and methods,
- 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 renewable energy supply, 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, and
- demonstrate an advanced skill which encourages interdisciplinary research and development work regarding energy-efficient building to design technically well performing and architecturally functioning solutions.

Judgement and approach

For a Degree of Master of Science (120 credits) students shall

- demonstrate the capacity to perform qualified judgments in the field of energy-efficient and environmental buildings, taking into account relevant scientific, societal and ethical aspects,
- demonstrate a conscious understanding of the effect and role that building design plays on the building inhabitants' environment, and the effect of buildings on the global environment, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning in the field of energy-efficient and environmental buildings.

2 Programme structure

The programme addresses energy use in buildings and the environmental impact considering three essential dimensions.

- Human comfort and health,
- Strategies and systems,
- Whole building design (building type and scale) and process.

The programme is designed to promote the integration of strategies and systems with building design, taking into consideration all human comfort parameters (thermal, olfactory, visual and acoustic) at all scales of intervention from materials-components-systems to small scale buildings (houses) or large buildings (e.g. office buildings, libraries, shopping malls). The courses will cover both new constructions as well as renovations of existing buildings. These various issues are explored taking into consideration energy-efficiency, moisture safety, indoor environment and life-cycle costs (investment versus operation costs) etc.

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 under-standing 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 consist 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 Further studies

On completion of the second-cycle degree, students have basic eligibility for third-cycle studies.

3 Admission requirements

A Bachelor's degree in architecture, civil engineering, architectural engineering or equivalent. Completed courses within the three subjects building technology/structural engineering, building physics/science and building services. A minimum of 3 credits/ECTS is required for each of these three subjects. In addition, a total of 30 credits/ECTS 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. English 6.

4 Degree

4.1 Degree requirements

For a Degree of Master of Science (120 credits) students must successfully complete courses comprising 120 credits, including a degree project worth 30 credits. At least 90 credits must be second-cycle credits and at least 60 credits of those must be in the main field of study, including the degree project.

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.

5 Special regulations

5.1 Travel expenses

The teaching includes study activities out of Campus. Any costs related to these activities are to be covered by the students themselves.