



## Programme syllabus

Faculty of Technology

Energi och management för hållbar utveckling, masterprogram, 120 högskolepoäng

Energy and Management for Sustainable Development, Master Programme, 120 credits

### **Level**

Second Level

### **Date of Ratification**

Approved by Faculty of Technology 2021-06-04

Revised 2021-12-10

The programme syllabus is valid from autumn semester 2022

### **Prerequisites**

General entry requirements for secondcycle studies and specific entry requirements:

- Bachelor's degree in technical subjects or a Bachelor's degree in Engineering (technology) or equivalent.
- English 6 or equivalent.

### **Description of Programme**

The program will provide an in-depth study of the subject of energy technology with special emphasis on the implementation of sustainable solutions. The program aims to deepen the competence in energy and sustainable management in various organizations of Swedish and international students who have completed a bachelor's degree in technology and/or engineering.

The program will lead to the ability to work productively within companies with product, energy and sustainability issues, but also in the long run have the opportunity to take leadership and managerial positions in multinational and national companies within the program's focus areas. Sweden is known as a pioneering country in energy technology and proactive sustainable methods.

### **Objectives**

**Central degree objectives in accordance with the Higher Education Ordinance**

*Knowledge and understanding*

For a Degree of Master (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

- I demonstrate specialised methodological knowledge in the main field of study.

#### *Competence and skills*

For a Degree of Master (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 clearly report 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 (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.

## Content

### **Program overview**

The program starts with a joint semester in technology and science-based courses on the climate situation, innovation systems, and calculation of environmental footprint. Term two consists of an economics block of specially composed courses for technicians, to develop the concepts of company organization and innovation, sustainability management and financing.

Year 2 offer a focus on in-depth knowledge of product imprints, organizations' energy strategies and development towards sustainable development. The student concludes with an in-depth degree project in the field, preferably in collaboration with companies. The courses in the program are given in English.

The courses in the program can, in agreement with the program manager, be exchanged for corresponding courses within the program's specialization. When exchanging courses, the program manager checks that the program's goals are still met. Prerequisites for courses and the local rules for degrees at Linnaeus University must always be met.

### **Courses in the programme**

## Year 1

### *Energy and Climate \* (7.5 credits, AIN)*

Energy and climate studies form the basis of the program, the first course in the program forms a common base and updating the state of knowledge today. The course wants to give the student in-depth information and knowledge to understand climate change from an energy planning / management perspective, be able to analyze different scenarios and energy alternatives, connections and conflicts between different goals.

### *Diffusion of Innovations for a Sustainable Built Environment\* (7.5 credits, AIN)*

This course includes various theories about the dissemination of innovations and their applications in the built environment. The development of a more sustainable built environment presupposes a widespread use of resource-efficient innovations. In order to design effective intervention measures, it is important to understand the process by which innovations are developed and disseminated in society, and what influences potential users' decisions.

### *Environmental Analysis Methods \* (7.5 credits, AIN)*

The course deals with various environmental paradigms and analysis tools to support environmental decisions, basic concepts relevant to energy analysis and environmental assessment, as well as analysis tools and methods for evaluating energy and the environmental impact of the built environment.

### *Scientific theory and method \* (7.5 credits, AIN)*

The course deals with structuring and writing of scientific articles according to international standards for scientific publication as well as presentation and discussion of relevant scientific issues in the field of technology. The course will prepare for the independent work with a focus on problem formulation, planning and organization of a research project, to be able to account for and choose methods as well as goals and boundaries.

### *Innovation, Entrepreneurship and Sustainability, (7.5 credits, AIN)*

The course is the first focused business administration course in the master's program and therefore introduces basic themes in entrepreneurship and innovation and how these can be applied in relation to sustainability and the energy sector specifically. Several themes introduced in the first course (Diffusion of innovations for a sustainable built environment), in this course will be developed in more detail, especially how to develop an organization from "beginner level" to become a systemic player with a robust innovation culture over time.

### *Management of sustainable innovations in organizations, (7.5 credits, AIN)*

The course focuses on different ways of leading innovation processes that very different organizational structures entail. Organizations of today are complex and ambiguous. Basically, there is usually the regular, formal, and hierarchical organization that often forms the structural basis of many organizations. In addition, there are many temporary forms of organization in today's organizations and innovation projects are often carried out in such forms. A third, and increasingly important form of organization, is also the extended organization ('the extended organization') where complex networks of organizations collaborate intensively through innovation projects at many different levels.

### *Circular Economy and Green Financing, (7.5 credits, AIN)*

The course has two equal parts in the form of circular economy and financial aspects of

circular economy. The course focuses on four things: 1) To describe circular economy as a concept and practice. 2) To critically reflect on society's linear resource consumption and contrast it with circular and entrepreneurial models for resource management. 3) To identify societal problems of a systemic nature and based on this focus on the development of entrepreneurial opportunities based on the logic and principles of the circular economy. 4) To provide an overview of the field of sustainable investments ('green finance') and thus an orientation of the many but complex ways in which an organization can finance innovation projects and innovation processes based on the principles of the circular economy.

*Environmental Accounting, 7.5 credits, A1N)*

The overall goal of the course is to provide knowledge about an organization's environmental reporting methods. The course focuses in particular on the meanings attributed to environmental and sustainability reporting; the links between environmental accounting and accountability; the decision phases regarding environmental reporting; how the guidelines for environmental reporting are developed; and how carbon dioxide reporting is governed by the European Union's Emissions Trading Scheme and the CO<sub>2</sub> emissions project. The course prepares to measure and manage environmental impact via environmental and sustainability reporting, as well as to develop and conduct environmental work.

## **Year 2**

Elective courses comprising 30 credits in the field of technology or business administration, other courses can also be chosen in consultation with the program manager (taking into account any international exchange).

The following courses will be recommended:

- *Energy policies* \* (7.5 credits, A1N) The course deals with how energy policy can be designed and implemented as well as the roles of different stakeholders. How a policy is designed, stakeholders, decision-making processes, implementation of policy instruments and how they can influence investment decisions and public action.
- *Life Cycle Analysis (LCA)* \* (7.5 credits, A1N) The course deals with LCA for different products and service systems, taking into account the use of natural resources and environmental impact throughout the life cycle chain, from raw material extraction to finished product.
- *Energy management in the built environment* \* (7.5 credits, A1N) The course deals with evaluation of energy supply and demand in the built environment, analysis of relevant processes and techniques to meet energy needs and evaluation of various solution proposals for environmental and climate impact.

*Independent work* \* (30 credits, A2E)

The purpose of the course is to provide skills in independently carrying out a project. The student must show their ability to apply the knowledge that has been acquired during the study period and thereby be able to define a problem, conduct a survey, evaluate the result in the light of previously known knowledge, and critically analyze and present the results.

\* courses in the main area

The courses in the program may change order.

### **Social relevance**

The entire program works on current issues about energy and climate and various solutions for sustainable social development. This means that students are faced with socially relevant problems (within eg industry, municipalities, regions, NGOs) and must formulate their proposals for solutions for these representatives. A number of companies have chosen to support the development of the program and will be involved in the program's courses in various parts such as guest lectures, project assignments and degree projects. In this way, the students are prepared for a future professional role and potential employers meet the students during the education.

### **Internationalization**

The students who wish to perform a part of the education abroad can do so during the third semester, alternative courses at another university may then be chosen in consultation with the program manager. Alternatively, the student can choose to complete his or her independent work in the fourth semester abroad.

### **Perspective in education**

The program will lead to an ability to work effectively in companies with product, energy and sustainability issues, but also in the long run be equipped for opportunities to take leadership and managerial positions in multinational and national companies, public organizations, and NGOs (non-governmental organizations ) within the focus areas of the program. Sustainable development and gender: Education in the field of energy and management for sustainable development is based on a sustainability perspective where class perspective, gender perspective, global resource management and international perspectives are consistent themes in most courses. The diversity perspective is automatically included as part of the courses offered on the international market, in that we have participants from different countries and groups. In the teaching, the students meet, give and learn different perspectives from each other's backgrounds, which is part of the basic idea of ??the program. The different international perspectives enrich the examples in teaching that are based on global goals. There is a conscious idea of ??creating equal conditions, e.g. through conscious group division strategies. At Lnu and specific to the School of Economics and there is an ethical code of conduct on equal treatment which is part of the accreditation AACSB.

### **Quality Development**

The courses in the program are evaluated after each course and the results are processed by the teacher team in consultation to improve until the next course start. The program is linked to a program council including representatives from industry, representatives for the subject and the student group. Quality aspects of the education (program evaluation) and results from the course evaluations will be discussed in this council.

### **Degree Certificate**

After completing programme studies, corresponding to the requirements expressed in the Higher Education Ordinance Degree Ordinance as well as Linnaeus University Local Degree Ordinance, the student may apply for a degree. Those who have completed the programme may obtain the following degree:

Student holding a Technology Bachelor's degree alt. Bachelor of Science in Engineering can receive:

Teknologie masterexamen med inriktning mot Energi och management för hållbar utveckling Huvudområde: Bioenergiteknik

Master of Science (120 credits) with specialization in Energy and Management for Sustainable Development  
Main field of Study: Bioenergy Technology

A student who holds another qualifying degree can receive:

Filosofie masterexamen med inriktning mot Energi och management för hållbar utveckling  
Huvudområde: Bioenergiteknik

Master of Science (120 credits) with specialization in Energy and Management for Sustainable Development  
Main field of Study: Bioenergy Technology

The diploma is bilingual (Swedish / English). Along with the diploma follows the Diploma Supplement (English).

### **Other Information**

Within the program, there are study visits, excursions, study trips and similar compulsory elements that may involve a cost for the student, furthermore it is assumed that students have the digital equipment required to be able to complete the education.