



Programme syllabus

Faculty of Technology

Innovation genom ekonomi, teknik och design - inriktning teknik, masterprogram, 120 högskolepoäng

Innovation through Business, Engineering and Design - specialisation Engineering, Master Programme, 120 credits

Level

Second Level

Date of Ratification

Approved by Faculty of Technology 2013-11-08

Revised 2021-12-10

The programme syllabus is valid from autumn semester 2022

Prerequisites

General entry requirements for second-cycle studies and specific entry requirements:

- Bachelor of Science in Technology or Engineering
- 15 credits in Mathematics; Calculus I, (7.5 credits), and Linear Algebra/Vector Geometry (7.5 credits) or the equivalent.
- English 6 or the equivalent.

Description of Programme

The purpose of the programme is to enable students with a degree in economics, technology or design to together develop their ability to initiate, lead and promote innovation processes focusing on sustainable solutions to a diversity of problems. The student gains advanced knowledge within their own main field of study, at the same time as there is collaboration and exchange with the other subjects. In the programme, the student also develops their knowledge of research and investigation methods used in the relevant subjects.

The overall pedagogical approach taken in the programme is to perform innovation processes through interdisciplinary collaborative projects. Students from different faculties and with different academic backgrounds work together with the aim of learning to identify problems from different perspectives and develop solutions requiring different kinds of knowledge and skills.

In the programme, the students gain knowledge and skills regarding the innovation concept, innovation processes, project work and project management, product development, and business and system development, in collaboration with businesses

and organisations. As a result, the students get a key role in the creation of future societies, and come into direct contact with professional work within their subject field.

Three faculties participate in the programme: the Faculty of Technology, the School of Business and Economics, and the Faculty of Arts and Humanities. Consequently, this syllabus is one of three syllabi making up the programme.

Objectives

General degree objectives in accordance with the Higher Education Ordinance

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.

Programme-specific objectives

Knowledge and understanding

For a Degree of Master of Science (120 credits) the student shall

- demonstrate knowledge and an interdisciplinary understanding of all the main fields of study covered by the programme.

Skills and abilities

For a Degree of Master of Science (120 credits) the student shall

- be able to lead and participate in interdisciplinary projects.

Content

Programme overview

The programme is hosted by the Faculty of Technology, and is carried out in collaboration with the School of Business and Economics and the Faculty of Arts and Humanities. The programme comprises 90 credits of compulsory courses, and 30 credits of courses of the student's own choice, within the main field of study.

There are three programme coordinators for the programme – one from each faculty. The programme coordinators have the overall responsibility for the coordination and coherence of the programme, for continuous quality development, and for the development of courses and the programme as a whole. They have a continuous dialogue with the teachers on the programme, and they coordinate collaboration with businesses and organisations nationally as well as internationally.

The programme starts out from the realisation that resources are limited, and that we need to find ways to meet people's needs without risking future generations. The complexity within human societies puts high demands on our ability to understand what needs people have in different parts of the world. At the same time, sustainable development requires a critical approach to how people, businesses and organisations intend to meet these needs. An interdisciplinary innovation process opens up for different perspectives in the process, and results in a holistic view of problems as well as solutions, from a local as well as a global point of view. Through this programme, the students will be able to participate in the innovation process together with different clients, and together identify problems and find sustainable solutions. As a result, the students develop their interdisciplinary insight and understanding – something that is further enhanced by the programme's reflective course components. The students' own future knowledge and research development is also stimulated.

First term:

The first term comprises two courses: **Local Innovation and Innovation Methods and Tools**.

The course **Local Innovation** is project based and provides knowledge and understanding of innovation and the innovation process in theory and practice. The students conduct innovation projects through an interdisciplinary process, in which each competence plays an active role. The course is divided into modules, and the students learn to work and collaborate in all parts of the innovation process, from the different subjects' perspectives. In addition to this, the course also deals with professional skill and the importance of teamwork in the realisation of innovation processes.

The course **Innovation Methods and Tools** gives an overview of scientific and artistic methods, and complements the project course in that the student gets to reflect upon and evaluate the methods that are used to create knowledge or solutions, how these methods are used, and how obtained information is analysed.

Second term:

The second term includes two courses: **Global Innovation and Innovation Processes and Research Methods**.

The course **Global Innovation** discusses academic aspects of, as well as professional practice within the three main fields of study. The course is project based and focuses on identifying and formulating complex problems from a system perspective, realising an innovation process in collaboration with businesses or organisations, and formulating strategies for implementation of ideas through interdisciplinary work. The course also discusses professional skill in depth.

The course **Innovation Processes and Research Methods** links scientific and artistic methods with research. The course also discusses the process involved in working with projects in depth.

Third term:

In the third term students specialise in the field of design, studying courses of their own choice, corresponding to the objectives of the programme. The courses are chosen in consultation with the programme coordinator and may also include exchange studies equivalent to 30 credits within the main field of study.

Fourth term:

In the fourth term the student conducts a degree project, in which they may collaborate across disciplines.

Courses in the programme

Year 1

Local Innovation, 22.5 credits, level A1N (compulsory)*

The course deals with innovation and the innovation process through interdisciplinary work.

Innovation Methods and Tools, 7.5 credits, level A1F (compulsory)*

The course deals with scientific and artistic methods to create an understanding of the views of different disciplines.

Global Innovation, 22.5 credits, level A1F (compulsory)*

The course deals with complex problems and deepens innovation processes in collaboration with different competencies through interdisciplinary work.

Innovation Processes and Research Methods, 7.5 credits, level A1F (compulsory)*

The course deals with scientific and artistic methods and their use to create knowledge as well as solutions through an innovation process.

Year 2

Elective courses in the technical field of study, 30 credits, chosen in consultation with the program coordinator

Degree project, 30 credits, level A2E (compulsory)*

The courses in the program can also be exchanged for other courses within the program's direction, in agreement with the program manager. In exchange for courses, the program manager checks that the program's goals and requirements are still met. The prerequisites for courses as well as the local rules for the Linnaeus University degree must always be met.

*Within the programme's main field of study

Societal relevance

In the programme, the student conducts a project in collaboration with businesses and organisations. The student is also given further opportunities to contribute to society in different ways.

Internationalisation

Exchange studies within the programme's main field of study may take place in the third term of the programme. Exchange studies are planned in consultation with the programme coordinator. The student is invited to choose from the full range of agreements that Linnaeus University has with foreign institutions of higher education. The fourth term's independent project can also be conducted partly abroad.

Programme perspectives In the programme, questions of sustainable development, gender and diversity are continuously brought up and discussed. The concept of sustainability is defined as one including environmental, financial, social, ethical and cultural aspects as well as aspects to do with the safety and wellbeing of mankind. At the core of the programme is the development of theoretical knowledge for the analysis of innovations, and on upon the student's core disciplines in relation to societal needs and how societies have defined and dealt with said needs. Development work within the programme shall focus on people's involvement, knowledge and understanding. The students practise their ability to critically review possibilities and limitations, in order to promote the development of an equal and sustainable society. This work shall be supported by the methods used in the program.

Through collaboration with both national and international businesses and organisations, knowledge and understanding is promoted from a local as well as a global perspective. The international perspective is furthermore strengthened when students from many different countries participate in the programme.

Quality Development

Continuous evaluation and improvement of the programme is performed by means of, among other things, course evaluations that are summarised in writing and fed back to the students. The students participate actively in the followup and development of the programme through the programme council. The results of the evaluations are used in the work with quality development. The programme coordinators are responsible for evaluating the relevance of the programme, in dialogue with collaborating businesses and organisations. The Faculty of Arts and Humanities has a quality system for the follow up and development of programmes. An education council prepares programme syllabi and other aspects concerning quality, such as the right to award degrees and the range of programmes offered, before the Faculty Board makes the final decisions. Revised and new syllabi are prepared in syllabus committees, before the head of department or the dean makes the final decision about ratification. Every year the range of courses and programmes offered is evaluated in accordance with the faculty's plan for systematic quality work.

Degree Certificate

After completed studies on the programme and when completed studies correspond to the requirements listed in the degree order in the Higher Education Ordinance and in the local degree order at Linnaeus University, students can apply for a degree. Students who have completed the programme can obtain the following degree:

Students who hold a bachelor of science in engineering from first level can obtain the following degree:

Master of Science (120 credits) with specialisation in Innovation through Business, Engineering and Design

Main field of study: Mechanical Engineering or Forest and Wood Technology

Students who hold a bachelor of science from first level can obtain the following degree:

Master of Science (120 credits) with specialisation in Innovation through Business, Engineering and Design

Main field of study: Mechanical Engineering or Forest and Wood Technology

The degree certificate is bilingual (English/Swedish). Along with the degree certificate students will also receive a diploma supplement (English).

Other Information

The programme includes components such as study visits, laboratory work and field work. This may entail certain costs for the student. The programme furthermore requires certain digital equipment.