Linnæus University

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Programme syllabus

Faculty of Technology

Innovation genom ekonomi, teknik och design - inriktning teknik, master program, 120 högskolepoäng

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

Level
Second Level

Date of Ratification
Approved by the Faculty Board within the Faculty of Technology 2013-11-08
The programme syllabus is valid from autumn semester 2014

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

- 90 credits in the main field of study Mechanical Engineering including 7.5 credits in Solid Mechanics, alternatively 90 credits in the main field of study Forest and Wood Technology including 7.5 credits in Mechanics (including a degree project of at least 15 credits) or the equivalent.
- 15 credits in Mathematics; Calculus I, (7.5 credits), and Linear Algebra/Vector Geometry (7.5 credits) or the equivalent.
- English B/6 or the equivalent.

Description of Programme

The aim of the programme is to provide students from the fields of engineering, business, and design with the opportunity to jointly develop their ability to initiate, lead, and act for the creation of innovations in our daily life. Students develop in-depth knowledge in engineering and at the same time there is collaboration and exchange with business administration and design. Students will obtain their master degree in their main field of study. The programme will provide students with a deeper knowledge of research and investigation methods in engineering. Students are also introduced to relevant research and investigation methods in business administration and design.

The programme provides students with skills in project and innovation management, process and product development, business and systems development, and societal entrepreneurship, making students important actors in the shaping of our future society.

The programme is based on the assumption that our resources are limited and that we will have to satisfy the needs of a constantly increasing number of people in the future. This will increase the complexity of society, which will require an ability to interpret what people in different parts of the world need, and that innovations and solutions that are developed live up to certain requirements. An interdisciplinary innovation process makes room for different perspectives and a more comprehensive view. Through the programme, students will be able to develop more sustainable solutions, taking into account functionality, shape, and resource efficiency.

The overall pedagogical idea for the programme is the interdisciplinary project work on innovation processes, in which students from different faculties, with different subject expertise, work together to come up with innovations that would not have been possible had each group worked separately. Through this method of working and through special reflection elements students develop an interdisciplinary insight and understanding. In addition, students' future knowledge and research development is stimulated.

The programme is offered as a collaboration between the Faculty of Technology, the School of Business and Economics, and the Faculty of Arts and Humanities. Therefore, this programme syllabus constitutes one of three programme syllabi that make up the programme. Revision of the programme syllabi requires that all faculties take part in the work.

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 understanding of the other main fields of study in the programme, and demonstrate an understanding of the increase in value of interdisciplinary collaboration.

Skills and abilities
For a Degree of Master of Science (120 credits) the student shall
- Independently formulate issues based on the joint knowledge of the project group
- Lead and participate in interdisciplinary and interorganisational projects
- Use and develop methods, technology, and processes for the handling of incidents, issues, and contexts in interdisciplinary project groups

Judgement and approach
For a Degree of Master of Science (120 credits) the student shall
- Demonstrate an in-depth understanding of one's professional role and the opportunity that comes with it to act in society

Content

Organisation
The programme is located at the Faculty of Technology and offered in collaboration with the School of Business and Economics, and the Faculty of Arts and Humanities.

The programme has one programme coordinator from each faculty. These have the overall responsibility for the cohesion and coordination of the programme, continuous quality work, and course and programme development.

Programme coordinators have a continuous dialogue with all teachers who teach on the programme.

Programme overview
In the work with innovations students shall be able to balance the different parts of the process regarding functionality, shape, durability, and conditions of production. This requires knowledge in, or collaboration between, different disciplines where different methods, perspectives, and ways of working are being used. The programme is based on joint projects, often in collaboration with the industry or organisations, together with in-depth studies in the student's main field of study and a broadening towards other disciplines. Experiences from project work are discussed and put in relation to the student's professional skills. Scientific methods used in the innovation process are studied in separate courses.

First term:
The first term consists of two courses; local innovation and methods at work. The course local innovation deals with innovation work through an interdisciplinary process. The course is based on the innovation process and studies each discipline's specific role in this process and how the process can be led. The course contains modules in which students learn to work within the innovation process from the perspective of other participating disciplines. The course contains specialisation in the main field of study and in-depth studies of leadership from each subject's perspective. In addition to this, professional skills are also treated. Scientific method is treated in a separate course with the aim to create an understanding for the scientific approach of different disciplines.

Second term:
The second term contains project modules in order to investigate how interdisciplinary project groups can act in companies, organisations, or within authorities. The course contains in-depth studies of the innovation process, conceptual development, and creative thinking. The projects require specialisation in the main field of study. In addition to this, professional skills are also treated. Action research and interactive methods are studied in a separate course.

Third term:
During the third term students specialise by taking eligible courses in the main field of study, chosen in consultation with the programme coordinator.

Fourth term:
Degree project

Courses in the programme
Year 1
Local innovation, 22.5 credits, level A1F (mandatory)*
Methods at work, 7.5 credits, level A1F (mandatory)*
Innovation for global impact, 22.5 credits, level A1F (mandatory)*
Action research and interactive methods, 7.5 credits, level A1F (mandatory)*

Year 2
Eligible courses in the main field of study, 30 credits, level A*
Degree project, 30 credits, level A2E (mandatory)*

*Within the programme's main field of study

Professional relevance and community contacts
During the programme, live projects will be carried out in collaboration with companies, authorities, and organisations. Through lectures by professionals, study visits, and workshops, students will get the opportunity to come into contact with the industry and the surrounding society.

Studies abroad
During the third term students can choose to study abroad. The degree project during the fourth term can also be carried out abroad. Studies abroad are to be planned in consultation with the programme coordinator. Students are offered to take part of the exchange agreements with foreign seats of learning that Linnaeus University has worked out.

Programme perspectives
Issues relating to sustainable development, gender, and diversity are discussed on a regular basis during the programme.

The concept of sustainability is defined as including environmental, financial, social, ethical, and cultural aspects, as well as health and well-being. Development of theoretical knowledge for analysis and reflection of one's own subject in relation to humans and society is central to the programme. Development work in the programme should have as its starting point people's inclusion, knowledge, and understanding. The ability to critically examine possibilities and limitations enables the development of an equal and sustainable society.

An international perspective on societal development, access to resources and the use of resources, as well as an understanding of human everyday life, is important in order to be able to carry out advanced innovation work.

Through collaboration with international companies and organisations possibilities are provided to build knowledge and an understanding of this. The perspectives are also dealt with at seminars. Furthermore, the international perspective is strengthened when students from other countries participate on the programme.

Quality Development

Continuous evaluation and improvement of the programme takes place, e.g., through course evaluations which are compiled into written reports and reported back to the students. Students actively participate in the follow-up and development of the programme through the programme council. In addition to course evaluations, there is a programme evaluation at the end of the programme, which is also reported back to the students. Evaluation results are used in the programme's quality development work. Programme coordinators are responsible for evaluating the relevance of the programme in consultation with the industry and society at large.

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 in Technology (120 credits) with specialisation in Innovation through Business, Engineering and Design
Main field of study: Mechanical Engineering/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/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 contains mandatory elements such as study visits, laboratory work, and fieldwork. Such elements may result in certain expenses; these are paid for by the students themselves.

In order to be admitted to the courses on the programme the specific requirements stated in each course syllabus must be fulfilled by the start of the course.