PROGRAMME SYLLABUS

Intelligent automation - masterprogram
Intelligent Automation - Master’s Programme
120 credits

Programme Code: INAMA
Academic Level: Advanced level
Version: 3

1 Name and Scope of the Study Programme
The programme is provided by the University of Skövde and is named Intelligent Automation - Master’s Programme. It comprises 120 credits.

2 General Objectives
Courses and study programmes on the advanced level shall involve the acquisition of specialist knowledge, competence and skills in relation to courses and study programmes on the basic level, and in addition to the requirements for courses and study programmes on the basic level shall:

- further develop the ability of students to integrate and make autonomous use of their knowledge,
- develop the students’ ability to deal with complex phenomena, issues and situations, and
- develop the students’ potential for professional activities that demand considerably autonomy, or for research and development work.

(Objectives for courses and study programmes on the advanced level, The Higher Education Act)

3 Programme Objectives
Main area of education is virtual product realization.

Objectives for Master’s Degree according to the Higher Education Ordinance

Knowledge and understanding
For a master’s degree (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 specialized methodological knowledge in the main field of study.

Competence and Skills
For a master’s degree (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 master’s degree (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.

Local Objectives for the Study Programme according to the University of Skövde

Students shall, after completion of the programme

• show broad and deep knowledge and understanding of how complex intelligent manufacturing systems are developed and managed,

• show broad and deep knowledge of current research and developments in intelligent machines and human-robot interaction,

• show broad and deep knowledge of current research and developments in industrial systems,

• show knowledge and understanding of how intelligent automation can contribute to sustainable development.

4 Programme Content

The programme provides broad and deep knowledge in automation engineering with a focus on the main field of virtual product realization. The programme specifically deals with intelligent autonomous machine systems working in collaboration with human operators. The students gain a deep understanding of industrial systems and also in depth knowledge about how intelligent automation is developed and managed in the industry. The programme emphasises the use of automation for improving efficiency and contributing to sustainable development.

The programme starts by introducing the basics of industrial systems and laying the foundation for specialization courses. The specialization courses deal with the theory, development and management of intelligent machines working in collaboration with human operators. The programme adopts a holistic view towards industrial automation where the main focus is on modelling, optimization of autonomous systems and intelligent machines. Other focus areas include the use of virtual tools for emulating intelligent machines and understanding industrial ergonomics. The students are also exposed to leadership, decision making, sustainable development and innovation aspects that arise within the industry. The programme ends with an individual degree project where the students formulate theoretical and practical scenarios within intelligent automation and apply their skills to solve them using a scientific approach.

The following courses are included in the programme

Alternative Manufacturing Methods A1N, 6 hp
Computational Intelligence A1N, 6 hp
Control Theory A1N, 6 hp
Engineering Project III A1N, 6 hp
Industrial Ergonomics A1N, 6 hp
Industrial Systems Philosophy A1N, 6 hp
Modelling and Optimization A1N, 6 hp
Product Lifecycle Management A1N, 6 hp
Research Methodology and Communication A1N, 6hp
Scientific Theory in Informatics A1N, 6hp
Systems Thinking A1N, 6 hp
Technical Leadership A1N, 6 hp
Virtual Intelligent Machines A1N, 6 hp
Autonomous Systems A1F, 6 hp
Sustainable Development and Innovation A1F, 6 hp
Master Degree Project in Virtual Product Realization A2E, 30 hp

5 Admission Requirements

A Bachelor degree of at least 180 higher education credits (equivalent to 180 ECTS) within the fields of integrated product development or production engineering or automation engineering or mechanical engineering or information technology or similar.
A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden, known as English course 6 / English course B. This is normally demonstrated by means of an internationally recognized test, e.g. IELTS, TOEFL or the equivalent.

The above admission requirements apply for admission to the programme. For further studies within the programme, the admission requirements for each course must be complied with. These admission requirements are specified in each separate course syllabus.

6 **Degree**
A student who passes the courses in the programme fulfills the requirements for obtaining a Degree of Master of Science (120 credits) with a major in Virtual Product Realization.

Degrees are awarded after application. Information about how to submit an application can be found on the University’s website.

7 **Approval of Study Programme and Programme Syllabus**
The study programme was approved by the Vice-Chancellor at the University of Skövde on 26 September 2017. This programme syllabus was approved by the Faculty Board at the University of Skövde on 6 December 2017. It is valid from the autumn semester of 2020.

8 **Changes to the Programme Syllabus**
The programme studies are carried out in accordance with the current programme syllabus in effect at the time when the studies were initiated, provided that the structure of the programme is followed and that no leave of studies has been granted.

In the event of continued studies after a period of approved leave of studies, the student is to follow the programme syllabus in effect the term that the student resumes his/her studies. If substantial changes to the programme syllabus have been made, the student may contact a student and career counselor in order to set up an individual study plan.

Reservations are made for the fact that the programme syllabus and its courses are subject to change, within the framework of the objectives of the programme.

9 **Additional Information**
The teaching is conducted in English.

Further information about the study programme will be available on the University’s web pages prior to a programme start.

National and local regulations for higher education are available on the University’s website.

During the programme, as well as after its completion, there are follow-ups. The main purpose of these follow-ups is to contribute to improvements of the programme. The students’ experiences and views constitute one of the criteria for the follow-up and are gathered by means of programme evaluations. The students will be informed of the results of the follow-up and any decisions regarding actions that are to be taken.