Programme Description

Master in AI and Automation

TAMAU – Autumn 24

Decision taken by	Department board
Document contact	Morgan Nilsen, Head of Programme
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This template for programme descriptions was adopted by the Research and Education Board, HV 2022/508, 21 September 2022, editorial change 25 October 2022. Programme description is a supplement to the programme syllabus which is the legally binding document.

Basic data

Department	Institutionen för Ingenjörsvetenskap
Division	Avdelningen för produktionssystem
Name of Programme, Swedish	Magister i AI och automation
Name of Programme, English	Master in AI and Automation
HE credits (number of credits)	60
Level (1st Cycle, 2nd Cycle)	2nd Cycle
Entry requirements, Swedish	Kandidatexamen med något av huvudområdena datateknik, elektroteknik, maskinteknik, industriell ekonomi eller motsvarande, alternativt en till omfattningen motsvarande högskoleingenjörsexamen. I utbildningen på grundnivå skall minst 5 hp programmering, 15 hp matematik samt Engelska B, Engelska 6 eller motsvarande.
Entry requirements, English	Degree of Bachelor of Science in computer engineering, electrical engineering, mechanical engineering or industrial engineering and management. Additionally, the Bachelor of Science degree must be comprised of a minimum of 5 HE credits in programming and 15 HE credits in mathematics. Verified knowledge of English corresponding to the course English B/English 6 in the Swedish Upper Secondary School (high school) or equivalent.
Main field of study, Swedish	Produktionsteknik
Main field of study, English	Production Technology
Degree, Swedish	Teknologie magisterexamen i produktionsteknik med inriktning mot AI och automation
Degree, English	Degree of Master of Science (60 HE credits) in production technology with specialization in AI
Rate of study (full-time, part-time)	Full-time

Type of instruction (on campus, distance teaching)	Campus
Language of instruction (Sw, Eng)	English

General programme information

This programme combines learning in production technology and computer science. This allows you to build unique expertise in both AI and automation, entering the job market as an innovative engineer, where you will shape new production systems and products. This combination is unavailable from most other universities. We built this programme for electrical engineers, mechanical engineers and computer engineers to become production technology engineers with advanced skills in AI and automation. Your curriculum is designed to meet the demands of the industry.

An added advantage of studying at University West is that you will also have easy access to the rich research environment at University West.

You'll gain practical experience through assignments as well as group and individual projects in close collaboration with corporate leaders in the industry. The entire programme has been built on the strength of a close collaboration between industry and University West. Every aspect is based on the real hiring needs of companies and research facilities in the industry.

The industry is facing a technological shift where sustainable, flexible and intelligent solutions are required to ensure companies' competitiveness. The fourth industrial revolution, Industry 4.0, has entered the industry, which requires personnel with skills in sensors, data processing, AI, and advanced automation. Future engineers and researchers also need knowledge of sustainable development, which, among other things, means being aware of and working for the future challenges defined in Agenda 2030. This education has a strong anchoring in the ongoing research that is conducted in production technology at the University West.

Programme contents, structure, and progression

The student gets a Degree of Master of Science (60 credits) in production technology with specialization in AI and automation.

The courses included in the program are shown in Figure 1.

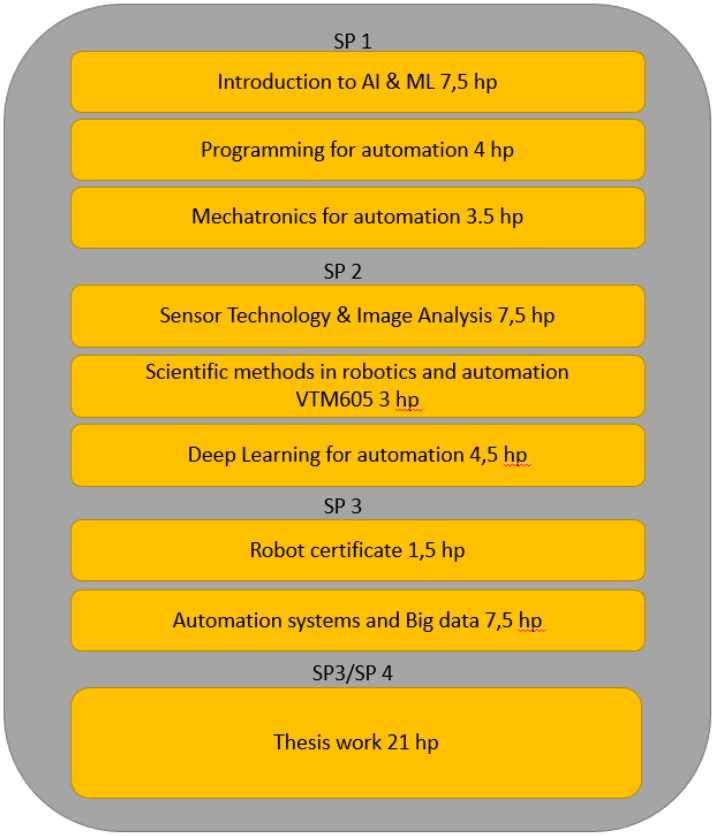

Figure 1 Courses in Master in AI and Automation 60 credits

The research basis for the programme

One of the priority areas within University West's strategy is its research in production technology. The proposed program has a strong connection to the research in production technology, above all in flexible automation and process control, which is conducted at University West. The research environment engages 15 senior researchers and 10 doctoral students. The access to this competence as well as the physical environment is a great asset for the program. The research in flexible automation and process control has a particularly strong connection to the program and by engaging researchers in this field as teachers in the program The program is seen as an important part of providing ongoing research with future doctoral students.

Through research in production technology, there is a large national and international network of universities/colleges, companies, and research practitioners. Production technology is a prioritized area in the region and there is a need in the area with large players such as GKN Aerospace, Volvo Trucks and more. The program's strong connection to the research and the companies within this network is a decisive factor in achieving work-integrated learning in the program. In order to bring academia and industry together, development of courses will take place in close collaboration with a number of companies within the industry. During the education, there will be a connection to the industry through projects connected directly to them and also projects that are connected to the research in production technology that is conducted at the University West. The training includes, among other things, project courses where the industry will be involved to ensure that the projects carried out are relevant for work-integrated learning.

The labour market, collaboration, and work-integrated learning[1]

With the development of the Internet of Things and the transition to Industry 4.0, many sectors now realise the importance and potential of AI and automation. AI and automation can support the increased need for flexible and highly automated production. Your studies are founded on the needs of leading companies operating in this sector. The industry needs engineers like you who understand:

- Flexible and sustainable automation
- AI and machine learning
- Sensor technologies
- Distributed systems
- Data mining and analysis

On graduation, you will be highly competitive for positions within the private sector or for further PhD studies. This degree qualifies you to hold positions such as:

- Automation engineer
- PhD student in production technology
- Systems engineer

[1] Work-integrated learning is a pedagogical practice in which students' learning takes place through the integration of theoretical and practical knowledge and experience, derived from an educational context within the framework of both higher education as a work environment and civil society.

- Project manager for design and development of new automation solutions

Sustainable development

Awareness of sustainability is strong in the programs on a social, economic and environmental level. These are the three prioritized sustainability areas in the overall university plan. The department for production systems is based on the 17 global goals for sustainable development set in the UN's Agenda 2030 for sustainable development both in research and in the courses in robotics and automation.

When it comes to courses in the program, one example of a course focusing on sustainability is Sustainable Automation which provides a good insight into the latest trends in automation with a clear emphasis on sustainability.

Internationalisation

Students from around the globe come together to create a unique and international environment. Your programme is fully taught in English, and you will study together with students from Sweden as well as international students from countries in Asia, Europe, Africa and North and South America.

Most of your instructors also have international experience in both research and education. This will enhance your cultural experience and English-language proficiency.