Master of Engineering, Automation Technology (60 SP)

Examen: **Högre yrkeshögskoleexamen i teknik**
Examensbenämning: **Ingenjör (högre YH)**
Beräknad studietid: **2 år**
Studieform: **Flerformsstudier** F

» Allmänna kompetenser

Kontaktuppgifter: Enheter | Utbildningsansvariga

Kod	Namn	Studiepoäng/år/totalt					
		1	2	3	4	5	Totalt
AD PRO	**Advanced Professional Studies**						SP
	Common Advanced Professional Studies	10					10 SP
TKV17AT01	**• Dynamic Systems** *Contents* *Reading and comprehending reliable, scientifically and technically high-level written articles and documentation is a necessary prerequisite for successful work in technologically developing fields. The course introduces the students to the methodology of writing scientific technical documentation and articles. Systems thinking is the holistic approach to a field of science as a whole, where cause and effect are entangled in a feedback network. The field of control systems relies heavily on systems thinking in the way it examines the feedback system and dynamics in general. Ways of describing these dynamics are presented as modeling and identification.* *The course aims at introducing the above to the students in order to achieve a common platform of knowledge for further studies.* *The parts of the course are; scientific articles and writing, systems thinking, dynamic systems, modeling, identification, optimization and feedback control.* *Methods* *Lectures, discussions and demonstrations. Independent work with scientific articles and writing technical material.*	5					5 SP
TKV17AT02	**• Development of Control Systems** *Contents* *The development of control systems involve understanding a chain of events. Proper understanding of research plans, specifications, project work and managements plus product development is an important fundament for the development of control systems. This course treats these topics by studying fundamental automation topics. These are specifically supervision and data acquisition in a modern, connected, network. In such networks communication methods and protocols are essential. Automated decision making and control is based on this platform.* *The course aims to introduce the above to the students in order to achieve a common platform of knowledge for further studies.* *The course consists of the following parts; research methodology, product development, project work and management, supervision, data acquisition, communication and control.* *Methods* *Lectures, discussions and demonstrations. Project work regarding modern supervision systems, data acquisition, communication methods or decisions and control.*	5					5 SP
	Specific Advanced Professional Studies	20					20 SP
TKV17AT03	**• Linear and Nonlinear System Identification** *Contents* *Process understanding is the key to successful automation and control. This understanding must necessarily include the understanding of the dynamics governing the behavior of the system. The availability of big amounts of data for various systems makes it possible to identify both linear and non-linear models to fit the data. The course treats system identification with starting point in linear, time-invariant systems and moves on to time-varying, nonlinear large-scale systems. The aim is to understand the benefits of small-scale simple models, e.g. for control purposes, while at the same time have the capacity to derive large-scale models when such are deemed necessary.* *Methods* *Lectures, discussions and laboratory-based project work.*	5					5 SP
TKV17AT04	**• Multivariable Control** *Contents* *In all automation systems the task of decision-making and control is the most challenging part and the part where human interaction as operators are most common. However, as optimization, more difficult control challenges and higher expectations evolve, also control and decision-making needs to be automated. Systems with multiple inputs and multiple outputs interacting dynamically need to be controlled. For such control tasks, the system description is usually based on the identification procedures. The course studies various approaches to structuring the problem through control structures. A special emphasis is put on understanding, designing and implementing model-predictive control. In that context, both linear models and especially non-linear models and processes are studied. The course also aims at giving a fundament to continued work on these topics on an applied research level.* *Methods* *Lectures, discussions and laboratory-based project work. Fundaments for research projects.*	5					5 SP
TKV17AT05	**• Supervisory Systems** *Contents* *The course focuses on modern supervisory systems in a network with both wire-based and wireless connections. In this context, communication and data-security increases in importance. Collecting data and being able to automatically detect missing data, faults and malfunctions is valuable. In such a system, a difficult challenge is data visualization and presentation as well as the usability and the design of the interface system. A special focus is put on applications in energy management including energy storage. The contents include data-driven and model-driven fault detection, interface design, usability, data security and decision making in supervisory systems.* *Methods* *Lectures, discussions and project-work. Identifying and preparing for research projects.*	10					10 SP

	Master's Degree Thesis						SP
AT17MT	**Master thesis**		30				30 SP