

## **Smart Sensing, 6 HE credits**

*Smarta sensorer, 6 hp*

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Established: 2020-06-04

Established by: Department of Engineering Science

Applies from: V21

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### **Learning outcomes**

After completion of the course, the student should be able to:

- show in-depth understanding of different methods and techniques to measure physical quantities in the field of robotics and automation
- demonstrate knowledge in analysis of the sensing system performance
- demonstrate knowledge in analysis/design of smart sensing system (Includes signal conditioning and self-calibration)
- show in-depth understanding ability to implement different methods for state estimation
- demonstrate knowledge in methods for sensor fusion

### **Entry requirements**

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. .

General entry requirements and approved result from the following course/courses:  
RBK600-Robot Certificate or the equivalent.

### **The forms of assessment of student performance**

Written exam, individual lab sessions with written examination, individual project with written and oral examination.

### **Course contents**

The course consists of two main parts, one part on smart sensors used in robotics and automation and the other part on the signal processing of the signals from those sensors. The first part of the course focuses on the intrinsic and extrinsic physical sensors used for robots and automation. The dynamics of the sensor, the sensing principle, transduction mechanism, self-calibration and I/O interfaces of the sensors used in robots will be analysed. The second part of the course focuses on state estimation and sensor fusion. The aim is to get knowledge in how to analyze sensor signals with different levels of uncertainty. These are methods widely used withing automation and robotics, especially mobile (autonomous robots).

### **Other regulations**

Course grading: F/Fx/E/D/C/B/A - Insufficient, Insufficient- more work required before the credit can be awarded, Sufficient, Satisfactory, Good, Very Good, Excellent

Course language: The teaching is conducted in English.

General rules pertaining to examination at University West are available at [www.hv.se](http://www.hv.se).

If the student has a decision/recommendation on special support due to disability, the examiner has the right to examine the student in a customized examination form.

### **Cycle**

Second cycle

### **Progressive specialization**

A1N - second cycle, has only first-cycle course/s as entry requirements

### **Main field of study**

Automation, Production Technology