Zurich University of Applied Sciences

School of Engineering

t.SEN - Sensorik

Person responsible for the course:	Michael Warden, wami
Responsible OU:	IMS
ECTS:	4
Valid for:	2012/2013
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Expertise:

Understanding sensors requires diverse knowledge in various fields of science. Accordingly the course promotes expertise in the areas of physics, mathematics, electronics and material science. The transfer of these specific skills to the concrete application of sensors is promoted.

Methodological skills:

Choosing the optimum sensors for a specific application requires a methological approach. This procedure will be detailed in the lecture. In the lab the students will learn how to take measurements and to characterize the various sensors in a systematic way.

Social skills:

In the lab sessions the students will work in teams of two. These teams will write reports on selected topics which will be reviewed. The team has to work together in a constructive manner in order to achieve their goals. The social skills required for this team work will be promoted.

Personal skills:

The students are required to work independently. They will have to deliver two written reports on specific lab sessions which they choose themselves.

Learning objectives:

Lecture:

The students are familiar with the various sensor technologies from a user's point of view. With respect to particular sensors they learn how to apply abstract physical principles and rules to specific sensors (transfer). They know the physical principles and the general sensor properties. They also understand the technical data of sensors such as error, stability, measuring range, response threshold, accuracy, sensitivity, hysteresis, or saturation. With this knowledge the students are able to lay out sensors for specific applications (analysis).

Practical Course (Lab):

The students are familiar with the selection criteria and the advantages and disadvantages of the various sensors. They can interpret the data sheets and also characterize the sensors.

Course content:

Lecture:

Chapter 01: Introduction

Chapter 02: Inertial Measurement Units (IMU)

Chapter 03: Ultrasonic sensors

Chapter 04: Inductive sensors

Chapter 05: Capacitive sensors

Chapter 06: Photoelectric sensors
Chapter 07: Magnetic sensors
Chapter 08: Contactless temperature sensors (IR-cameras)
Chapter 09: Strain gauge sensors
Chapter 10: Force sensors
Chapter 11: How to choose a sensor

Practical Course:
Important properties of the sensors discussed in the lecture will be measured, analyzed and compared. Each team will write a detailed report on two specific sensors.

Previous knowledge:

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Teaching method:

Type of lesson:	**Number of lessons per week:**
Lecture	14x2
Tutorial/Practicum	7x4
Block instruction	

Assessment:

According to the table or as specified in writing by the lecture at the beginning of the semester!

description	**type**	**form**	**scope**	**assessment**	**weighting**
Performance records during school hours	2 reports	writen		1-6	2*20%
Semester end exam	exam	writen	90 minutes	1-6	60%

Language of instruction:

German

Instruction material:

Current books on sensor technology (exact titles will be given during the course)
script
Practical course material

Additional literature:

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Comments:

None