Sensors for Smart Systems

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	2.3	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester, starting 2022/23	60

Module Convenor	Professor / Lecturer
Prof. Dr. Julia Heigl	Arno Erzberger

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the module group *Digital Technology* of the Digital Technology and Management Bachelor's degree program. The usability in other courses of study must be checked in each individual case.	Lecture; case studies; practical exercise; demonstration	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
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After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional skills and competencies:
- know structure and basic elements of sensors
- know physical sensor principles
- know physical signal transmission
- evaluate performance and accuracy of sensors
- evaluate sensor specifications
- know costs and prices of sensor solutions
- know sensor system interfaces (electrical and mechanical)
- evaluate sensor system integration
- know and evaluate disturbances variables and the related system impact.

Methodological skills and competencies:
- decide if a sensor is necessary in the system or not
- decide what kind of sensors are necessary in the system
- cost-benefit consideration in sensor selection and design
- question and evaluate sensor specifications, requirements and performance

Personal skills and competencies:
systematically and competently communicating commercial and technical sensor requirements with product developers and sensor suppliers.

Course Content

This module provides students with a comprehensive overview of the broad field of sensors for smart systems in the lecture, covering functional principles, signal processing, interfaces and applications. The various sensors are presented systematically. Basic concepts for sensing requirements and performance are presented, and costs and prices for sensor deployment are evaluated. In addition to the technical/physical understanding and resulting costs, the ability to communicate professionally with both sensor/system developers and sensor suppliers is provided. A detailed practical example example with live-demonstration of a technical/commercial sensor design is developed, evaluated and alternative solutions are considered. Solutions for various sensor tasks are worked out and presented by individual student groups.

Teaching Material / Reading

Jacob, Fraden, "Handbook of Modern Sensors", Springer Verlag
Olfa, Kanoun, Nabil, Derbel, Faouzi, Derbel "Sensors, Circuits & Instrumentation Systems", De Gruyter

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided starting in the semester the module is taught for the first time	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.