Hochschule Konstanz
University of Applied Sciences

Course number: WPB 15020
Sensors & Data Acquisition
Study level: Bachelor / Undergraduate

Prof. Dr. Hartmut Gimpel

Language of instruction: English
ECTS Credits: 4

Objectives:

- Acquiring basic knowledge of sensors and methods for data acquisition for measuring non-electrical observables
- Understanding that measurement problems are almost always solved in an interdisciplinary way (physics, electrical engineering, mechanical engineering, computer science)
- Familiarization with the methods and concepts used to measure quantities, with an emphasis on quantities relevant to mechanical engineering
- Acquiring fundamental knowledge of the analysis of measurement data, including basic digital signal processing
- Selecting the appropriate measurement methods and suitable sensor for a measurement task
- Strengthening teamwork skills in the laboratory when solving measurement tasks in small groups

Contents:

- Fundamentals of sensors and methods for data acquisition
- Calculation of measurement uncertainties according to GUM, test process suitability
- Physics foundations of important sensor principles
- Overview of sensors and measurement methods with an emphasis on sensors relevant to mechanical engineering
- Computer-driven data acquisition and signal analysis methods
- Measurement of force, torque, pressure, length, temperature, level, acceleration, etc.
- 3D coordinate measurement technology, surface measurement technology
- Programming of measurement applications in LabVIEW or using an Arduino

Methods of Instruction:

This course consists of a classical lectures (2 credits) and several mandatory laboratory experiments (2 credits).

Assessment:

Final Examination: 100%