

Courses in English

Course Description



Department	06 Applied Sciences and Mechatronics
Course title	Microsensors and Energy Harvesting
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	<p>Related to the generic educational objectives of the degree program, this module intensifies the engineering knowledge in engineering physics with focus on micro sensors and actuators. Students gain the ability to describe the functionality of micro sensors and actuators, to interpret data sheets, to measure device characteristics, and to interpret measurement results.</p> <p>After completing this module, students can express advantages and disadvantages of different sensors and actuators for a given application, and they can choose application-related an appropriate device.</p>
Prerequisites	solid state physics, materials science, basics in sensors
Recommended reading	see accompanying Moodle course
Teaching methods	180 h, of which: 60 h seminaristic teaching + presentation of a research publication 120 h individual work
Assessment methods	written exam 90min
Language of instruction	English
Name of lecturer	Prof. Dr.-Ing. Christina Schindler
Email	christina.schindler@hm.edu
Link	http://www.fb06.fh-muenchen.de/fk/vita.php?id=738&lang=1&lang=0
Course content	<p>Basics of sensor technology</p> <ul style="list-style-type: none">-- characteristics-- measurement uncertainty-- noise mechanisms <p>Microsensors</p> <ul style="list-style-type: none">-- Temperature sensors (based on metals, semiconductors, and ceramics, Seebeck-effect, band-gap temperature sensors)-- Measurement of force, pressure and strain (strain gauges, piezoresistive and piezoelectric sensors)-- Application: sensors in medical technology, building technology, and process control <p>Microactuators</p> <ul style="list-style-type: none">-- Basics in transducer technology-- Electrostatic actuators-- Piezo-transducers-- Application: positioners for microscopy, micropumps in medical technology <p>Energy Harvesting</p> <ul style="list-style-type: none">-- principles of energy harvesting from the environment-- setup and functionality of miniaturized and energy self-sufficient devices-- Application: Sensor operation under a harsh environment, research in the field of "Wearable Electronics" <p>Work on scientific publications and presentation</p>
Remarks	The exam can also be given in German