

<b>Level:</b> PhD				
<b>Course title:</b> Trends in Chemical Sensors (DSH-616)				
<b>Status:</b> Elective				
<b>ECTS:</b> 15				
<b>Requirements:</b> None				
<b>Learning objectives</b> The aim of the course is that students who have knowledge in chemical, especially instrumental analysis, biochemistry, and electrochemistry, learn the principles of operation of the sensor in chemistry, their preparation, and their application for different target analytes.				
<b>Learning outcomes</b> Mastered the necessary knowledge of the principles of operation of the sensor in chemistry, their preparation, as well as aspects of their application to different targets.				
<b>Syllabus</b> <i>Theoretical instruction</i> Conductometry. Potentiometry. Working electrodes. Electrodes with liquid membranes (based on ionic exchangers, neutral carriers, ionophores). Voltammetry. Pulse techniques (DPP; DPV, SWV, etc). Stripping voltammetry. Electrochemical gas sensors. Biosensors (enzymatic biosensors, immunosensors, DNA sensors, oligonucleotide sensors). Enzymatic amplifiers. Biosensor chips. Scanning electrochemical microscopy and its application. Quartz crystal microbalance. Surface plasmon resonance spectroscopy (SPR). Atomic force microscopy. Optical chemical sensors (direct optodes and indirect optodes). Optothermal detector. Sensors based on optical fibers. Flow systems (FIA and SIA). Sensors as detectors in chromatography. <i>On line</i> and <i>in vivo</i> measurements. Wireless signal transport. Chemical sensors and the nanoscale. Sensor-systems/arrays for multianalytes.  <i>Practical instruction</i> Seminars and practical work appropriate to lectures.				
<b>Weekly teaching load</b>				Other:
Lectures: 5	Exercises:	Other forms of teaching:	Student research: 5	