PRINCIPLES AND APPLICATIONS OF SENSORS **Elective module** **6 CP**

Content:

Sensor technology is being used in the fields of industry, agriculture, commerce, traffic, environmental analysis, medical diagnosis, and military research. It is an important branch for the modern information network.

Lecture:

The introduction of definitions, components, types, marks, and fundamental characteristics of sensors. Firstly, the principles will be introduced according to the application of the sensors. Electrochemical sensors, optical biosensors, and MEMS sensors will be included. Secondly, the data processing, visualization and diversification will be introduced. The technologies of data recognition, internet of things, and data fusion will be included. Thirdly, the introduction of design and application of sensors in the "real world". The application of sensors in the fields of medicine, health, and environment will be included (containing the fields of family and community, medicine application, environmental analysis, fitness and lifestyle).

Seminar:

The application of sensors will be introduced through some typical themes, such as fitness and health, personalized medicine, public health, national security, water and food, and environment problems. Firstly, the introduction of sensitive materials and intelligent materials, and the discussion of the research and design of new sensors. Secondly, the introduction of the challenges and chances of sensors in application. Thirdly, the outlook of prospects of artificial intelligent with analysis of intelligent sensors, data processing system, and big data technology.

Educational Objectives / Competences:

The aim is to help students to know the principle of sensors, background and development of sensor, classification and symbols, basic characteristic of sensors. The knowledge of sensor system in medicine and environment analysis, and the design of simple sensor system and data analysis system, will be understood by the students. In the future, students can distinguish the challenges from technology and non-technology, and solve the problems from development of sensor application directly.

Frequency of module:	Once a year (summer semester)
Duration of module::	1 semester (8 weeks block)
Requirements for participation:	Basic knowledge in English
Organizational Information:	The module will be held in English.
Proof of Study (Proof of Participation / Certificate of Performance):	Regular and active attendence at the seminar
Final Module Examination / Form of Examination:	Written exam
Requirements for attaining CP:	Passing the final exam
Applicability to other Course of Study :	Elective module for students in the Master course for Chemistry and Biochemistry

Teaching units	**Typ**	**SWS**	**Semester / CP**			
			1	**2**	**3**	**4**
Lecture Principles and Application of Sensor	V	2.5	4			
Seminar Principles and Application of Sensor	S	1	2			