

Course title: Electronic Systems and Metrology	Neptun code: GEVEE405-a
Course coordinator: Dr. Gábor Kozsely, PhD, senior lecturer	
type of lesson and number of lessons: lecture (2)	
method of evaluation: colloquium	
curriculum location of the subject: (autumn/spring semester): autumn and spring	
pre-study conditions (<i>if any</i>): -	
The task and purpose of the subject:	
Theoretical knowledge and practical knowledge of computer-controlled measuring systems at system integrator level.	
Course description:	
Theoretical knowledge of computer-controlled measuring systems and practical knowledge at the system integrator level. Measurement of transistor connections, measurement of operational amplifier connections, computer-supported measurement technique in the LabView environment: I/O management, measurement of sensors, solution of independent individual tasks. Measurement theory, modeling of measurement systems, planning and optimization of measurement procedures. Signal and system models. Handling continuous and discrete signals, analyzing stochastic signals. Application of mathematical methods of measurement data processing, simulation design of random error estimation methods. Development of data processing software for statistical, regression, empirical density function, error accumulation management for metrology applications. Processing of measured signals in the time and frequency domain. Spectrum analyzer development. Theory and practical application of digital filtering. Intelligent measurement systems: Design of the hardware structure of measurement systems, theory and practical application of sensors, design of analog signal conditioners. Design of measurement data collection systems. Analysis of connections and dependencies between sampling methods and data processing methods. Methods of on-line control of measurement processes. Simulation and development of timing and alarm methods of on-line measurement systems. Evaluation of the reliability of alarm techniques, error management methods.	
Required literature:	
<ol style="list-style-type: none"> 1. Seippel, Transducers: Sensors and Detectors, Brady (Robert J.) Co ,U.S. (April 1983.) 2. Kourosh Kalantar-zadeh, Sensors: An Introductory Course, Springer, 2013. 3. Gupta, Gourab: Smart Sensors and Sensing Technology, Springer 2008. 	
Recommended literature:	
<ol style="list-style-type: none"> 1. J.G. Webster: The Measurement, Instrumentation and Sensors Handbook, 1998. 2. Samir Mekid: Metrology and Instrumentation: Practical Applications for Engineering and Manufacturing (Wiley-ASME Press Series) 1st Edition. Wiley Press, 2021. 3. O. N. Pandey: Electronics Engineering. Springer Nature Switzerland AG, January 2022 	