

Name of the subject: Measurements		NEPTUN-code: KMXMTBABNE	Contact hours/week: 1 lectures + 0 practice + 2 lab. practice
Credits: 2 Requirement: Midyear grade		Prerequisite: Electricity I practice. K**VT12*NE	
Lecturer: Zsolt Markella	Beosztás: associate professor	Kar és intézet neve: Kandó Kálmán Faculty of Electricity Institute of Instrumentation and Automation	
Subject			
Aim of the course: To attain the measuring principles, necessary for measuring basic electrical quantities. Knowledge of construction and handling of most important electrical measuring instruments, interpretation of their technical specification. Knowledge, necessary to select optimal measuring methods and instruments.			
Thematics:			Cont. hours
Basic concepts of measurements. Definition and aims of measurements. Classification of signals. Units of quantities. The SI system of technical units. Etalons of electrical quantities. Classification of measuring methods. For of the result measurement. Sources of errors in measurements. Description of errors. Series of measurements, evaluation of the results. Histogram and probability density function. Distribution functions. Best estimation of the result of the measurement. Accumulation of the errors during mathematical operations. Displaying the measured results. Regression. Correlation.			2
Measuring direct voltages. Classification of the instruments. Application for measuring DC voltage and for DC current.			2
Measuring alternating voltage. Useful parameters of alternating voltage and current. Operating principle and specification of electromechanical measuring instruments for alternating voltage. Classification and parameters of analog electronic instruments for measuring alternating voltage. AC/DC converters and their specification			2
Oscilloscopes: classification, basic operation modes of analog oscilloscopes. Units of oscilloscopes: the mainframe, the vertical deflection system, operation modes, parameters. The horizontal deflection system, operation modes, parameters. Triggering modes. Application of oscilloscopes for measuring amplitude, frequency, time, phase-shift etc.			6
Measuring current by converters.			1
Measuring resistance. Application of DC bridges for measuring electrical resistance. Digital method for measuring resistance. the four-wire method.			1
lab. practice			
Basics of the measurements			4
Measuring current and voltage			12
Oscilloscope and generator usage			12

Visit of the lectures and the laboratory practice are obligatory.

Students should write a test every weeks.

There are two type of test:

- „starter test”: 2 questions from new measurements starter question lists
- „test for mark”: 5 questions from the previously measured themes

The complete semester mark is the mathematical average of the „test for mark” marks.

Literature:	
Compulsory: Dr. Horváth Elek:	Méréstechnika jegyzet (ÓE-KVK-1161)
Optional: Kiss Ernő: Schnell: Helfrick-Cooper: Chin:	Elektronikus műszerek Jelek és rendszerek mérés technikája Modern Electronic Instrumentation and Measurement Techniques Elektronic Instruments and Measurements