



## SUBJECT DATASHEET

<b>Semester:</b>	2009/10/2
<b>Subject:</b>	Data Acquisition Systems
<b>Code:</b>	VEMKFIB255M
<b>Responsible department:</b>	Institute of Physics and Mechatronics
<b>Responsible department code:</b>	MKFI
<b>Responsible lecturer:</b>	dr. Péter Gurin

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### Educational objectives:

Digital signal processing in practice. Design and building of the software and hardware of measuring equipments.

### Detailed content of the subject:

Lecture 1. Basics of data acquisition and data processing. 2. Sensors and actuators. Analog and digital signals. D/A and A/D converters. Signal processing. 3. On-line and off-line data acquisition. 4. Computer for data acquisition. Operation system, interrupts, DMA, local bus systems. 5. Data acquisition with PC: internal and external instruments. 6. Plug-in data acquisition boards. 7. Basics of serial communication: RS-232 and RS-485. 8. IEEE communication protocol. GPIB, IEEE 488.1, IEEE 488.2, SCPI 9. Communication through USB port. 10. Parallel port. Ethernet and LAN. 11. Data acquisition boards (DAQ) 12. Data storage and compressing techniques. 13. Data processing and analysis. 14. Mode analysis. Hardware and software. 15. Measuring and control systems in the industry. Laboratory 1. Basics of the LabVIEW. The virtual instrument. 2. Simple data types. Function block diagram. Controls and indicators. 3. Derived data types. Programming structures. 4. Sequence of operations. Synchronizing. 5. Communication with external equipment (RS232, TCP/IP). 6. Complex instrument control. 7. PID temperature stabilization by LabVIEW. 8. NI USB-6008 DAQ board 1: Installing of the equipment. 9. NI USB-6008 DAQ board 2: Signal visualization, frequency measurement and signal generation. 10. NI USB-6008 DAQ board 3: identification of simple electronic circuits. 11. Spectral analysis. 12. Data acquisition by microcontroller 1: Programming of microcontroller in C. 13. Data acquisition by microcontroller 2: Programming of microcontroller in C. 14. Data acquisition by microcontroller 3: start and stop of a DC motor. 15. Essay written

### Requirements:

Fulfill the main tasks in the measurements and provide a written results and analysis.

### Required and suggested references:

J. Park, S. Mackay: Practical Data Acquisition for Instrumentation and Control Systems, Elsevier, 2003.  
LabView dokumentáció R. Isermann: Mechatronic Systems: Fundamentals, Springer, 2003.



# UNIVERSITY OF PANNONIA

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