UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2015/16/1
Course:	Data Acquisition Systems
Code:	VEMKFIB255M
Responsible department:	Institute of Physics and Mechatronics
Department code:	MKFI
Responsible instructor:	dr. Péter Gurin

Course objectives:

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

Course content:

Lecture
1. Basics of data acqusition 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 acuusation.
4. Computer for data acqusation. Operation system, int3errupts, DMA, local bus systems.
5. Data acqusation with PC: internal and external instruments.
6. Plug-in data acqusation boards.
7. Basics of serial communication: RS-232 and RS-485.
8. IEEEcommunication protocol. GPIB, IEEE 488.1, IEEE 488.2, SCPI
9. Communication through USB port.
10. Paralell port. Ethernet and LAN.
11. Data acqusation boards (DAQ)
12. Data storage and compressing techniques.
13. Data processing and analysis.
14. Mode analysis. Hardware and software.
15. Measuring and control systems int he 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 oerations. Syncronizing.
5. Communication with external equipment (RS232, TCPIP).
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, freqvency measurement and signal generation.
10. NI USB-6008 DAQ board 3: identification of simple electronic circuits.
11. Spectral amalysis.
12. Data acqusation by microcontroller 1: Programming of microcontroller in C .
13. Data acqusation by microcontroller 2: Programming of microcontroller in C .
14. Data acqusation by microcontroller 3: start and stop of a DC motor.
15. Essay written

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Requirements, evaluation and grading:

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

Required and recommended readings:

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