UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2012/13/1
Course:	Design of Mechatronic Systems
Code:	VEMKFOB154T
Responsible department:	Department of Process Engineering
Department code:	MKFO
Responsible instructor:	dr. Béla Lakatos

Course objectives:

The aim is to introduce the fundamentals and methods of systematic design of complex production and integrated systems in mechatronics. It is considered how subsystems of diverse physical nature can be integrated into mechatronic equipments consisting of heterogeneous physical parts providing the fundamental methods and techniques for that purpose

Course content:

1. The concept and fundamentals of systems design. Conceptional, preliminary and detailed design. 2. Hierarchy and phases of systems design. Top down and bottom up strategies. 3. Anatomy of mechatronic equipments and systems. The aspects of integration and miniaturization. 4. Fundamentals of model-based design. Computer-aided design and software's applicable for design. Introduction to 20-sim. 5. Analogies in modelling elements and subsystems of diverse physical nature. Power representation, power ports, causality, information ports. 6. Electrical, mechanical, hydraulic, pneumatic, thermodynamical, physical-che-mical, chemical elements. 7. The concept and fundamentals of Bond-graphs. 8. Design of analogous and discrete mechatronic by means of Bond-graphs. 9. Design of reliable systems from non-reliable elements. 10. Design of robust mechatronic systems.

Requirements, evaluation and grading:

Grading is based on a written midterm examination and the written final exa-mination. Each examination consists of 2 general questions and 2-4 problems to be solved. The final mark is determined according to following table based on the weighted average of the points obtained for the midterm and the final written examination (ratio of midterm and final exam weights=0.33/0.67): % final mark above 85 excellent (5) 75-84 good (4) 65-74 medium (3) 50-64 pass (2) below 50 fail (1)

Required and recommended readings:

Alciatore, D.G., M.B. Histand, 2003, Introduction to Mechatronics and Measurement Systems. McGraw-Hill, Boston. Bishop, R.H. (Ed.), 2002, The Mechatronics Handbook. CRC Press, Boca Ranton. Karnopp, D.C., Margolis, D.L. & Rosenberg, D.L., System Dynamics: Modeling and Simulation of Mechatronic Systems. Nesculescu, D., 2002, Mechatronics. Prentice-Hall, New York. Blanchard, B.S. and W.J. Fabrycky, 1998, Systems Engineering and Analysis. (3rd Edition). Prentice Hall, Upper Saddle River, New Jersey.