UNIVERSITY OF PANNONIA

SUBJECT DATASHEET

Semester:	2009/10/2
Subject:	Control of Process Systems
Code:	VEMKFOM158T
Responsible department:	Department of Process Engineering
Responsible department code:	MKFO
Responsible lecturer:	dr. Tibor Chován

Educational objectives:

Acquiring the theoretical fundamentals and practical methods of the control of process systems

Detailed content of the subject:

The structure of the controlled process. Hierarchy levels of the process system and the control functions. Representation of control systems, P&I diagrams, standards. Basic control level: regulatory control, multivariable control, advanced control. Sequential control, process start-up and shut down, batch processes. Control fundamentals: feed forward and feedback schemes, optimal control, feedback of model error, model predictive control, adaptive control. Advanced control algorithms: cascade control, selecting control, inferential control, adaptive control, statistical process control. Control design (structure, tuning, stability), continuous and discrete systems. Design of feed forward control. Design of feedback control: traditional PID control, model-based control. Direct synthesis method. Internal model control. Model predictive control. MIMO systems. Application of methods of artificial intelligence (fuzzy and neural network models, soft sensors). Coordination control. Formalization of the control problem, Solution techniques (optimisation). Batch process control, the S88 models. Control of the complete plant. Design of the process control system. Decomposition techniques, analysis of the degree of freedom, sensitivity analysis. Design of control of typical unit operations. Control of compressors, pumps, heating and cooling systems, air conditioning systems, reactors, distillation and other separation units. Practice: Application of Matlab/Simulink and the Toolboxes. Input-output models. State-space models, Identification. Practice: Design of feed forward blocks. Tuning of continuous PID controllers. Discrete PID control. Dead-time compensation. Direct synthesis method. Design based on internal model control (IMC). Practice: Fuzzy and neural network control algorithms. Model predictive control. Multivariable control systems (MIMO). Simulation and control of complex systems.

Requirements:

Grading is based on the results of 2-3 midterm exams and 3-4 laboratory reports. Midterm exams consist of theoretical and practical parts. Theoretical parts cover the control methods and algorithms. Practical parts involve solving particular control problems. The grade is determined with the weighting of results of the midterm exams and the reports. Repeated examinations cannot be taken in the examination period. Required and suggested references: Szeifert F., Chován T., Nagy L., Almásy G.: System modelling and analysis, Univ. textbook, VE-48/94, Veszprém, 1994. Szeifert F., Chován T., Nagy L.: Control algorithms - control design, Univ. textbook, VE 4/95, Veszprém, 1995.

UNIVERSITY OF PANNONIA

SUBJECT DATASHEET

Semester:	2009/10/2
Subject:	Control of Process Systems
Code:	VEMKFOM158T
Responsible department:	Department of Process Engineering
Responsible department code:	MKFO
Responsible lecturer:	dr. Tibor Chován

Required and suggested references:

Szeifert F., Chován T., Nagy L., Almásy G.: Rendszermodellek-rendszeranalízis. VE jegyzet, VE-48/94, Veszprém, 1994. Szeifert F., Chován T., Nagy L.: Szabályozóalgoritmusok - szabályozó tervezés VE jegyzet, VE 4/95, Veszprém, 1995.