Course descriptions

Course name: Computer controlled systems	**Credits: 5**
Class type: lecture/practical, hours per week: 2/2	
Type of the exam: oral exam	
Semester:	
Prerequisities (if exist): Probability, Statistics	
Course description:	
Introduction, basic notions of signals and systems, motivation examples. System classes, basic system properties. Input-output and state-space description of continuous time linear time-invariant (CT-LTI) systems. Input-output (BIBO) stability of CT-LTI systems, stability criteria in the frequency domain. Asymptotic stability of CT-LTI systems. Application of the Lyapunov-method for CT-LTI systems. Observability and controllability of CT-LTI systems. Joint controllability and observability, minimal realizations, general decomposition theorem. Controller design for CT-LTI systems: PI and PID controllers, pole-placement control in the state-space. Linear Quadratic Regulator (LQR) for CT-LTI systems. Observer design for CT-LTI systems: Luenberger-observer and Linear Quadratic Estimator (LQE). Sampling, discrete time linear time-invariant (DT-LTI) system models. Observability, controllability and stability of DT-LTI systems. Discrete time stochastic linear time-invariant system models. Kalman-filter.	
Required reading:	
Katalin Hangos, József Bokor, Gábor Szederkényi. Computer Controlled Systems, Veszprémi Egyetemi Kiadó, Veszprém, 2002.	
Recommended reading:	
Thomas Kailath. Linear Systems, Prentice Hall, 1980; Ferenc Szidarovszky, A. Terry Bahill. Linear Systems Theory (second edition), CRC Press, 1998; Sigurd Skogestad, Ian Postlethwaite. Multivariable Feedback Control: Analysis and Design, Wiley, 1996.	
Lecturer (*name, position, degree): Dr. Gábor Szederkényi*, professor, DSc.	
Additional lecturers, if exist (*name, position, degree):* **Dr. Gábor Szederkényi**, professor, DSc	