Full time training
English – Mechatronics engineers – MSC
Specialization in Informatics

State exam's questions
Systems and Control Theory

1. Definition of the concept of System and Control. Typical model classes: LTI, LPV, qLPV, generally nonlinear systems.

2. The general form of the solution of the equations of motion of the externally excited 1st order LTI systems: the response in the time domain as a convolution.

3. Stability, controllability, and observability of the LTI systems (similarity transformation, Jordan canonical form, Cayley-Hamilton Theorem);

4. Introduction of the frequency domain for LTI system models: the Laplace Transform and the transfer function in the frequency domain for multiple variable first order LTI systems: fractional matrix elements, poles and zeros.

5. The transfer function of the higher order single variable LTI systems in the frequency domain.

6. Bode diagram and Bode stability criterion for single variable LTI systems: limitations of this method.

7. Nyquist stability criterion.

8. The basics in PID control: the relaxation of the integrated error: stability prescription by the use of the Lyapunov equation.

9. The basics in PID control: guaranteeing stability by ploynomial-exponential products.

10. The basics in PID control: the method of Pole Placement for higher order single variable LTI systems considered as special1st order multiple variable systems.