Lista zagadnień na egzamin dyplomowy

Kierunek studiów: **Automatyka i Robotyka** Stopień studiów: **pierwszy**

Specjalność: **Automatyka**

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| Nr | Zagadnienie |
| 1 | Ways to pass arguments to functions in C++. **[Information engineering]** |
| 2 | The role of the IP address in network communication. **[Information engineering]** |
| 3 | Basic laws of electrical engineering. **[Electrical engineering]** |
| 4 | Conservation laws in physics. **[Physics]** |
| 5 | Basics of wave optics (interference, diffraction, polarization). **[Physics]** |
| 6 | Parameters of random signals. **[Signals and dynamic systems]** |
| 7 | Fourier transformation - its physical meaning and properties. **[Signals and dynamic systems]** |
| 8 | Controllers and control performance in a closed-loop system. **[Automatic control]** |
| 9 | Stability of linear continuous-time systems. **[Automatic control]** |
| 10 | Modelling of dynamical systems in discrete-time. **[Automatic control]** |
| 11 | Sampling versus control performance and properties of a model. **[Automatic control]** |
| 12 | Effects of presence of nonlinearities in control systems. **[Automatic control]** |
| 13 | Programming model for real-time systems. **[Real-time systems]** |
| 14 | Process synchronization and communication mechanisms. **[Real-time systems]** |
| 15 | Measurement uncertainty. **[Metrology]** |
| 16 | Sensors and transducers of non-electrical quantities. **[Metrology]** |
| 17 | Software and hardware implementation of combinational circuits. Minimization of logical expressions. **[Microprocessor systems]** |
| 18 | Software and hardware implementation, incl. multiplexers, demultiplexers, flip-flops and memory; software and hardware implementation of sequential circuits. **[Microprocessor systems]** |
| 19 | Peripheral systems (GPIO, TIM, ADC, DAC) of the microcontroller, their operation and hardware interfaces. **[Microprocessor systems]** |
| 20 | PWM with analog filter as an analog output, PWM for analog signal optoisolation, signal generation, calibration problem. **[Microprocessor systems]** |
| 21 | Direct and Inverse kinematics of robot manipulators. **[Robotics]** |
| 22 | Classification of methods for solving inverse kinematics of robot manipulators. **[Robotics]** |
| 23 | Robot control methods. **[Robotics]** |
| 24 | Design and manufacturing process of the Printed Circuit Board (from concept to manufacturing, assembly and testing). **[Electronical and electrical circuits designing]** |
| 25 | Basic system identification methods for ARX and OE structures (including model order estimation). **[System identification]** |
| 26 | Identifiability and parameter estimation in a closed-loop system. **[System identification]** |
| 27 | Determining models in the state space. **[Control theory]** |
| 28 | State observers. **[Control theory]** |
| 29 | Principle of operation of basic functional blocks of programmable controllers, timers and counters. **[Digital controllers and PLC]** |
| 30 | Cycle of operation of a programmable controller. **[Digital controllers and PLC]** |
| 31 | Data description in JSON. Complex data structures. **[Mobile and embedded applications for the Internet of Things]** |
| 32 | Web interface architecture. Implementation of server side (e.g. using PHP) and implementation of client side (HTML, JS and requests of HTTP ). **[Mobile and embedded applications for the Internet of Things]** |
| 33 | Basic concepts in project management. **[Project management]** |
| 34 | Scalar and vector control of AC induction motors. **[Control of motion and electric vehicles]** |
| 35 | Cascade control of position, speed and current of the electric drive - influence of limitations on output signals. **[Control of motion and electric vehicles]** |
| 36 | Advanced control structures (2DOF, Smith predictor, internal model control, predictive model control, artificial neural networks). **[Analysis of control systems]** |
| 37 | Numerical modelling of dynamic objects. **[Analysis of control systems]** |
| 38 | Modelling of the time delay. **[Analysis of control systems]** |
| 39 | Types of production and concepts of their automatization. **[Flexible manufacturing systems]** |
| 40 | Petri nets. **[Flexible manufacturing systems]** |