Lista zagadnień na egzamin dyplomowy

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

Specjalność: **Robotyka**

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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 | Normal stress - strength criterion, allowable stress, and factor of safety. **[Theoretical mechanics and mechanics of materials]** |
| 7 | Parameters of random signals. **[Signals and dynamic systems]** |
| 8 | Fourier transformation - its physical meaning and properties. **[Signals and dynamic systems]** |
| 9 | Controllers and control performance in a closed-loop system. **[Automatic control]** |
| 10 | Stability of linear continuous-time systems. **[Automatic control]** |
| 11 | Modelling of dynamical systems in discrete-time. **[Automatic control]** |
| 12 | Programming model for real-time systems. **[Real-time systems]** |
| 13 | Process synchronization and communication mechanisms. **[Real-time systems]** |
| 14 | Measurement uncertainty. **[Metrology]** |
| 15 | Sensors and transducers of non-electrical quantities. **[Metrology]** |
| 16 | Software and hardware implementation of combinational circuits. Minimization of logical expressions. **[Microprocessor systems]** |
| 17 | Software and hardware implementation, incl. multiplexers, demultiplexers, flip-flops and memory; software and hardware implementation of sequential circuits. **[Microprocessor systems]** |
| 18 | Peripheral systems (GPIO, TIM, ADC, DAC) of the microcontroller, their operation and hardware interfaces. **[Microprocessor systems]** |
| 19 | Direct and Inverse kinematics of robot manipulators. **[Robotics]** |
| 20 | Classification of methods for solving inverse kinematics of robot manipulators. **[Robotics]** |
| 21 | Robot manipulator dynamics model. **[Robotics]** |
| 22 | Robot control methods. **[Robotics]** |
| 23 | Hybrid force/position control of robots. **[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 | Communication mechanisms between nodes in Robot Operating System. **[Tools and software for robotic systems]** |
| 32 | Scientific libraries available in Python. Describe at least two of them. **[Tools and software for robotic systems]** |
| 33 | Components of multi-rotor flying platforms. **[Flying robots]** |
| 34 | Components of control algorithms of flying robots. **[Flying robots]** |
| 35 | Mechanical joints in machine design. **[Mechanical constructions]** |
| 36 | Motion commands of robot manipulators and their parameters. **[Robot programming and task planning]** |
| 37 | Kinematic singularities of robot manipulators. **[Robot programming and task planning]** |
| 38 | The purpose and limitations of using motion commands with approximate positioning. **[Robot programming and task planning]** |
| 39 | Tool calibration methods and their parameters. **[Robot programming and task planning]** |
| 40 | Offline robot programming. **[Robot programming and task planning]** |